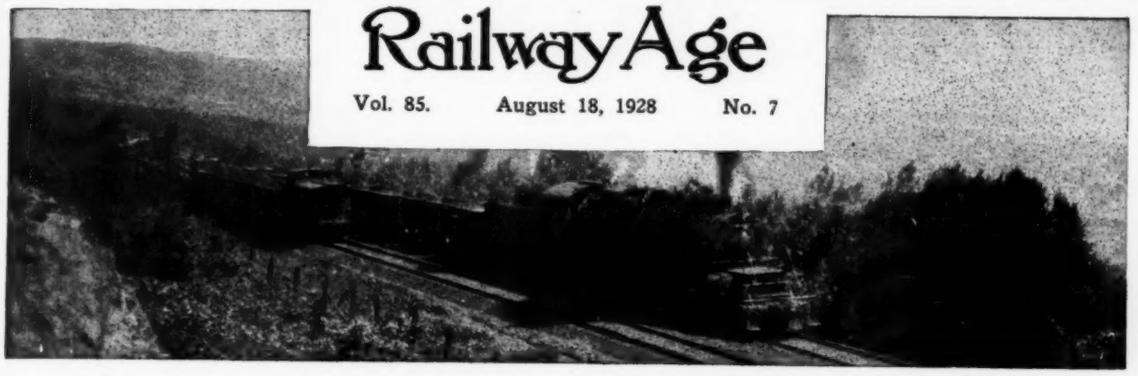
Railway Age

Vol. 85. August 18, 1928 No. 7



On the Duluth, Missabe & Northern near Duluth, Minn.

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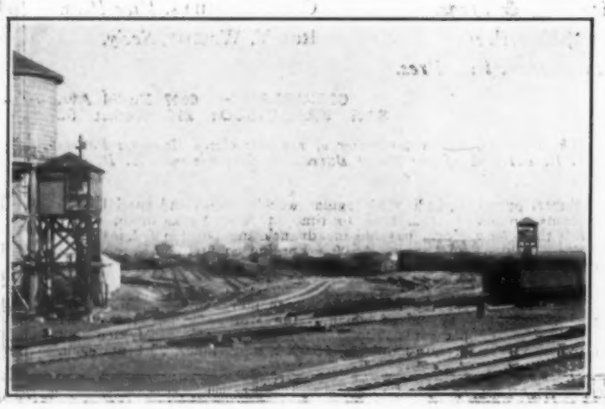
What will "Union" do for

Coal Car passing through "Union" Car Retarder at dedication of Boston Yards.

Above—Inbound Boston Yard
Below—Outbound Boston Yard
The first yards to use the track arrangement of grouping the classification tracks, which makes possible a reduction in the number of retarders required.



"Union" Electro Pneumatic Car Retarders are proving themselves assets in more ways than in producing savings resulting from the elimination of car riders, car damage and personal injuries.

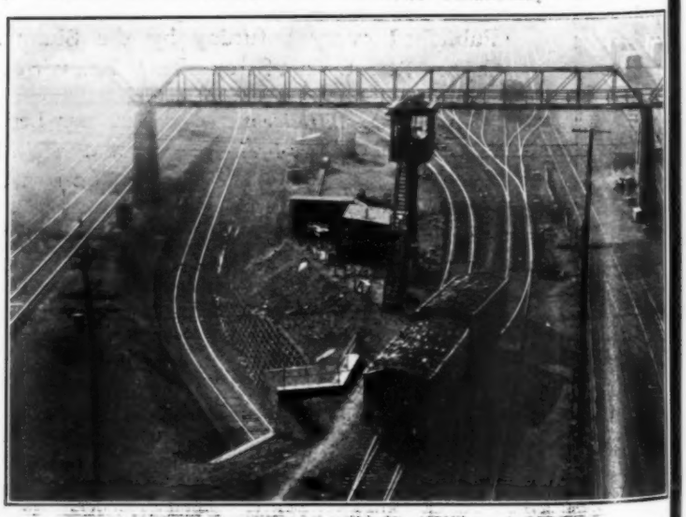
Showing Shippers

In Boston, nearly 2,000 invited shippers, railroad executives and government officials witnessed an impressive demonstration at the dedication of the two new "Union" equipped yards of the Boston & Maine. These yards have shown savings in time up to 48 hours in the delivery and dispatch of cars.

Affects Terminals

At Portsmouth, Ohio, early this year, the Norfolk & Western placed in service its "Union" equipped yard which classifies exclusively coal originating on its own line in Virginia and West Virginia.

Westbound Portsmouth Yard which handles coal exclusively.



Railway Age

Vol. 85, No. 7 August 18, 1928

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Joint Effort Needed in Passenger Traffic Merchandising

WE drew attention recently in these columns to the co-operative advertising campaign of the British railways to promote passenger business and raised the question as to whether some such plan could not profitably be applied on this side of the Atlantic. We should like to raise the question again. The need for railroad co-operation in that part of passenger traffic merchandising which concerns them all in common becomes more apparent as highway competition continues to make inroads into passenger business. A short time ago a man, not very familiar with railroads, went to a consolidated ticket office to buy about $300 worth of transportation. He found that the general information bureau had been discontinued and that to plan his trip he had to go from road to road, and, when he had completed his itinerary, he still had an uneasy feeling that perhaps he had been routed the long way around or perhaps over some road not making a specialty of de luxe travel. He finally bought his tickets, but not without a considerable feeling of bitterness. The major passenger traffic problem today, so it seems to us, has shifted from competition among the railroads to one of competition between the railroads on the one hand, and other forms of transportation and other ways to spend money on the other. Is it not logical, when individuals have a problem in common, to join together to meet it, rather than for each one to fight a lone and unco-ordinated battle?

Accounting Problems of Regulated and Unregulated Industries Vary

UNREGULATED industry can utilize many methods not open to railroads. Suppose, for instance, a local case where intensive truck competition for a certain commodity should develop. If the railroads could lower their rates without notice, applying only to this local situation, they could probably hold the business. In one state chain stores do not flourish. The reason is that that state has a law requiring them to maintain uniform prices on all their products in all stores. The individual store, therefore, cannot lower the price of an article to meet local competition without bringing down the price of this commodity in all stores making up the chain. This restriction is one which the railroads have everywhere to face. They cannot meet local situations when they arise with methods recognized as ethical for other business. The railroads must handle the business offered them, or any new business they may solicit, at pre-determined and inflexible rates. Their problem, therefore, is not to allocate costs and profits to individual commodities but rather to regard their transportation service as a whole, trying to handle it with efficiency sufficient to make it yield a reasonable profit. Thus it follows that accounting problems of an industry such as the railroads differ from those of an unregulated industry which can charge what it pleases, accept or refuse business and vary widely in quoting prices. Complex cost accounting plans are probably worth-while in some industries, but such accounting has not been demonstrated to be either necessary or desirable for the railroads. The public interest would not be served by increasing the expenses of the railroads for mass production of figures, which could not accomplish any purpose commensurate with the cost of their production.

Car Officers Unite

A SIGNIFICANT and praiseworthy step in the interests of car department economy and efficiency was taken, as noted elsewhere in this issue, when the executive committees of the Railway Car Department Officers' Association and the Southwest Master Car Builders' and Supervisors' Association recently agreed on a joint program for a convention at St. Louis, September 11 to 13, and perfected plans for consolidating the two associations into a single body to be known as the Master Car Builders' and Supervisors' Association. The first association mentioned, formerly known as the Chief Interchange Car Inspectors' and Car Foremen's Association, has long served the interests of the railways and railway car department supervisors by disseminating information regarding car matters and widening the acquaintance and experience of its members. The Southwest association, formed less than two years ago by a body of progressive car men in that territory, has made notable progress along the same line. The aims of the two associations were practically identical; the membership requirements were the same; the setting up of a joint program will assure a larger convention attendance, provide a better program, avoid duplication of effort and eliminate the expense of one convention. In the main, everything is to be gained and nothing lost by uniting the two associations, and as soon as the executive committees met it was evident that the members were not disposed to permit any personalities or minor difficulties to stand in the way of the consolidation. The feeling prevails that there are too many associations in the railway field, and there is a growing sentiment that the associations must justify their existence by the quality of the service they render, or else cease functioning. In certain cases, like that of the car men, two or more associations, admittedly helpful, can doubtless function even more effectively if consolidated, and at less expense both to the railways and to the supply industry. The officers and members of the Railway Car Department

Officers' Association and the Southwest Master Car Builders' and Supervisors' Association are to be congratulated for their constructive action in moving voluntarily to unite their organizations.

Maintrackers and Extended Engine Runs

THE numerous benefits arising from the adoption of the "maintracking" system of handling freight trains have been set forth in general and specific terms in various issues of the *Railway Age* in the last few years. There is one benefit of "maintrackers", however, that is not usually stressed, and that is the great aid provided by such a system to the extension of engine runs. "Maintracking" systems have normally proved efficient and economical. Similarly, in all but a few instances, extended engine runs have been successful. It is from the combination of the two, however, that the greatest benefits have been derived. To a large extent, they supplement each other. Both have for their primary purpose the elimination of terminal expense and delays. This result is obtained by different means under the two systems, but this does not prevent their combined use with excellent effect. "Maintracking" and extended locomotive runs have both passed the experimental stage and proved themselves worthy of incorporation in the modern operating scheme.

A Refusal to Arbitrate

THE threatened strike of the conductors and trainmen of the western railways grows out of differences between them and the railway managers which are as clean-cut as they are significant. One of these is as to whether railway managements shall receive the co-operation or opposition of organized labor in increasing the efficiency necessary to enable the railways to pay high wages and, at the same time, operate with the greatest economy compatible with such wages. The other is as to whether differences between the railways and their employees that cannot be settled by negotiation or mediation shall be submitted to voluntary arbitration under the Watson-Parker Railway Labor act.

All the engineers, firemen, conductors and trainmen of the country's railways, excepting the conductors and trainmen of the western lines in road service, have secured, by negotiation or arbitration, advances in wages of 6½ to 7½ per cent. The Conference Committee of Managers of the western lines offered their conductors and trainmen an advance of 7½ per cent if they would agree to the elimination of certain rules, or of 6½ per cent if these rules were to be retained. The rules in question do not exist in eastern or southern territory. They restrict the use of more than one locomotive on a train and also limit the number of cars that can be hauled in a double-headed train. It is essential to the greatest practicable economy that the railways shall haul in each train the maximum number of freight cars that operating and traffic conditions will permit. Without any change in existing rules an advance of 7½ per cent in wages would cost the western lines one million dollars a year more than an advance of 6½ per cent, but the elimination of the objectionable rules would enable them to effect economies that would more than offset this difference.

The conductors and trainmen for years have been, in most respects, among the most conservative and loyal classes of employees. The trainmen's brotherhood has, however, sought constantly to limit the length of trains and has promoted state legislation for this purpose. If the conductors and trainmen should accept an advance of 7½ per cent, instead of 6½ per cent, all the employees of these classes would benefit by the larger advance. On the other hand, only about one-fourth of them would be affected by the elimination of the double-heading and train-limit rules while it would enable the railways to make important economies. The labor leaders are willing to accept 7½ per cent and the retention of existing rules, but they decline to accept this advance for all the conductors and trainmen rather than agree to the elimination of the arbitrary rules.

The stand taken by the leaders of the conductors' and trainmen's organizations is in direct opposition to all those tendencies in the railroad and other large industries which have made possible the present high wages of American labor. The railroads and other large industries of this country are able to pay higher wages than those of any other country because they are more efficiently conducted and in consequence their production per employee is greater than that of the industries of any other country. The advance in the average freight rate of the western railways since before the war has been only about 35 per cent, while the advance in the average hourly wage of their employees has been about 135 per cent. Owing mainly to this wide disparity between the advances in their rates and wages the average return earned by them on their property investment during the last eight years has been only about 3½ per cent. In the absence of the great economies in operation that have been effected it is inconceivable that the wages paid by them would have been or could have been advanced as much as they have been. Labor organizations that insist on rules that restrict efficiency oppose the progress in operation which alone makes it possible for the railways to both pay high wages and charge low rates. Already large amounts of traffic are being diverted from the railways to other means of transportation, with the result of reducing the number of men they can employ at present wages. By insisting upon restrictive rules that make transportation by rail needlessly expensive, railway labor organizations stimulate this tendency, to the detriment of their own members.

The reason why the conductors and trainmen in the road service of the western railways have received no advance in wages, while other employees in the train service of the railways throughout the country have received advances, is that in June, 1927, an arbitration board organized under the Watson-Parker Railway Labor act held that western conductors and trainmen in road service were not entitled to an advance. The out come of this arbitration undoubtedly explains their recent refusal to arbitrate. But they are not alone in being dissatisfied with results under the Watson-Parker act. There have been numerous arbitrations under that act since it was passed by Congress only two years ago with the support of all the railway labor organizations and a majority of the railways, and every one of them has resulted in an award of an advance in wages. Even

the award which denied an advance to the conductors and trainmen in the road service of the western railways granted an advance to their yardmen. Most railway managers do not believe that all the advances in wages awarded by arbitration boards under the act have been justified. The managers of many western railways are especially dissatisfied because they have been practically forced to pay increased wages while they have been earning far less than a fair return and under powerful pressure for reductions in freight rates, especially on farm products.

Refusal of the conductors and trainmen to arbitrate their remaining comparatively small differences with the western railways would be construed as a repudiation by them of the Watson-Parker act. There are many railways to which such a development would not be unwelcome. They believe the Watson-Parker act is a failure; that the labor provisions of the Transportation act provided a better and fairer means of settling labor controversies; and it would not cause them any pangs of regret if the labor unions should begin to destroy the existing law. Therefore, if the conductors' and trainmens' organizations persist in their refusal to arbitrate, and seriously menace the western railways with a strike, the effects upon legislation for the settlement of railway labor disputes may be highly important.

The Trend in Freight Car Conditions

A STUDY of the available statistical material which has a bearing on the general condition of the freight car equipment on American railroads and the amount of work being expended in keeping up the equipment, bears out strikingly the generally accepted fact that, during the years since the shopmen's strike, freight car conditions have been getting progressively better and that, during the last year or two, they have probably been better than at any time in the experience of the present generation of railroad officers.

The Car Service Division in its semi-monthly reports of freight car conditions furnishes the material with which this progressive improvement may be traced step by step, so far as it applies to the Class I railways of the United States. An inspection of these reports shows that, with the exception of 1924, there has been a steady improvement in the proportion of equipment out of service for repairs since 1922. This has been accompanied by a steady decline in the average number of cars receiving repairs monthly. Thus, in 1925, an average of 69,700 cars received heavy repairs monthly, while in 1926 and 1927 the number had reduced progressively to 67,300 and 62,000, respectively. Similarly, in the case of light repairs, with an average of 1,321,000 cars turned out monthly in 1925, the number was reduced to 1,312,000 and 1,240,000, respectively, in 1926 and 1927.

Such a decline in the amount of work required to keep a growing percentage of the equipment in serviceable condition is reflected in a decline in the amount of labor employed in the maintenance of rolling stock. In 1925, which marks the beginning of the steady decline in the amount of labor employed in car maintenance, the average hours of carmen's labor paid for monthly ran well over 24 million. In 1926, this monthly average had been reduced by approximately a half million, while in 1927 it had dropped well under 22 million.

What is of interest at the present time, however, is not so much the record of the accomplishments of the past three or four years as the evidence that this period of improving conditions is apparently at an end.

A study of the freight car condition reports indicates a well-defined yearly cycle of high and low unserviceable percentages. Since 1925, the high percentages occur in the months from June to August and the low percentage occurs during the month of December. In 1925, the range was from 8.7 per cent in June to 6.9 per cent in December; in 1926, from 7.4 per cent in June and August to 5.7 per cent in December, and in 1927, from 6.5 per cent in August to 5.9 per cent in December. What is significant in these figures is that the seasonal decline in the percentage of unserviceable equipment at the end of 1927 was higher than that at the end of 1926, and that the percentage had increased to 6.9 per cent in May of this year—a figure slightly higher than the maximum of 1927. This has been accompanied by a continuation in the decline in the amount of car maintenance labor paid for, which in April of this year had dropped slightly below 20 million hours, and by a smaller average number of cars repaired per month during the early months of the year than during the same months of 1927.

While these figures cannot be construed as indicating an accumulation of deferred maintenance, they suggest that the large reserve of serviceability accumulated as a result of the heavy rehabilitation program begun in 1923 and completed during the years since, has reached the point where it is beginning to be drawn on at a greater rate than it is being restored, and that the prevention of a gradual decline will require an early increase in the number of cars receiving heavy and and rebuild repairs, or that older equipment will need early replacement with new cars of completely modern construction.

New Conditions Demand Adoption of New Methods

PROBABLY the most important fact which those who are trying to help solve the railroad problem must recognize and be influenced by is that conditions affecting the railroad industry have changed within recent years, and are still changing. New conditions demand new methods. Railway officers and regulating authorities who do not familiarize themselves with these new conditions, grasp their significance and adapt their methods to them will hinder the solution of railroad problem.

Formerly the railroad industry could rely confidently upon a large increase in traffic within any given period of years. There were large areas which were unsettled and undeveloped, and the extension of railway lines into which was sure to cause a rapid increase of population and a relatively more rapid increase of production. The railways got practically all the increase in freight business resulting. Likewise, as population and travel increased, the passenger business of the railways grew in proportion.

In consequence, for many years the one great prob-

lem of the railways was that of expanding their facilities, either by building new lines or enlarging the capacity of those already in existence. Sometimes competitive construction did harm by dividing traffic that was not sufficient for all competing lines. Sometimes the total mileage and capacity of the railroads increased so rapidly that they outran the growth of population and the demands of commerce. But these conditions were but temporary. Until within the last decade almost every extension or expansion of the railroad plant was soon justified by a corresponding or larger increase in traffic.

The railroad business is one of "increasing returns" that is, other things being equal, an increase of traffic will cause an increase of gross earnings exceeding the increase of operating expenses required to handle it, and will result in an increase of net earnings. Consequently, during the long period of years when traffic was rapidly increasing many things were done which tended to reduce net earnings, but which did not actually have that result. The constant increase in traffic obscured and offset the effects of advances in wages, of excessive competition in service and rate-cutting to capture competitive tonnage and passengers, and many other practices of a like character.

Effects of Decline in Growth of Traffic

The conditions outlined no longer exist. Some of them have disappeared permanently, some perhaps only temporarily. There is little virgin territory left to develop. The increase of population is being slowed down by restriction of immigration. The motor vehicle has not only stopped the increase, but has caused and still is causing a great decline of railway passenger business. For various reasons, some of which are obscure, freight business does not grow as formerly. Highway and water carriers are competing effectively for it. Improvements in the use of coal, and the increasing use of substitutes for it, have prevented any substantial increase in the production of coal for some years. Decentralization of manufacturing has occurred, with the result of causing raw materials and finished products to be hauled shorter distances to their markets.

Whatever, and however many, may be the causes, the fact that within recent years freight business has not grown as it formerly did must be faced. To anticipate that it will not grow substantially in future would be illogical. On the other hand in view of recent experience, to anticipate that it will not grow as fast in future as it did for years before the war seems logical.

The railroads within recent years have expanded their facilities in anticipation of a larger increase in traffic than has occurred, and in consequence, have surplus capacity. This condition existed at times in the past, and there is being plainly manifested a tendency to resort, because of it, to methods that formerly were but too familiar. Each railroad wants traffic, especially freight, to handle with its surplus capacity, and many of them are offering special inducements to attract shippers. They initiate reductions of rates, trade purchases for traffic, give new transit privileges and other forms of special service. Some railways, when unusually prosperous, have made voluntary advances in wages with apparently little consideration of the probable effects upon the condition of the industry. The large increases in total traffic and earnings which formerly obscured or offset the effects of excessive individualism in management and competitive follies have not recently been forthcoming, and, in consequence, practices of the kind mentioned contribute more largely than formerly toward reducing net earnings.

What these facts suggest seems quite plain. First, the railways need a better policy of conserving their earnings. Competitive rivalries in rate-making and service are more dangerous than formerly, because there are not available as large increases in traffic to provide the means of paying for indulgence in them. Secondly, there is less need than formerly for the investment of capital to expand facilities, but as much or more need for the investment of capital to effect economies in operation. A concern or industry which has a rapidly growing business, and correspondingly increasing total earnings, may be able constantly to increase its net earnings without its management devoting itself intensively to improvements in plants and methods aimed solely at effecting economies. On the other hand, the management of a concern or industry which is confronted with a declining or only slowly growing business must devote itself intensively to the study of capital improvements and operating methods aimed solely at effecting economies, or it is likely to find itself unable to maintain, much less increase, its net earnings.

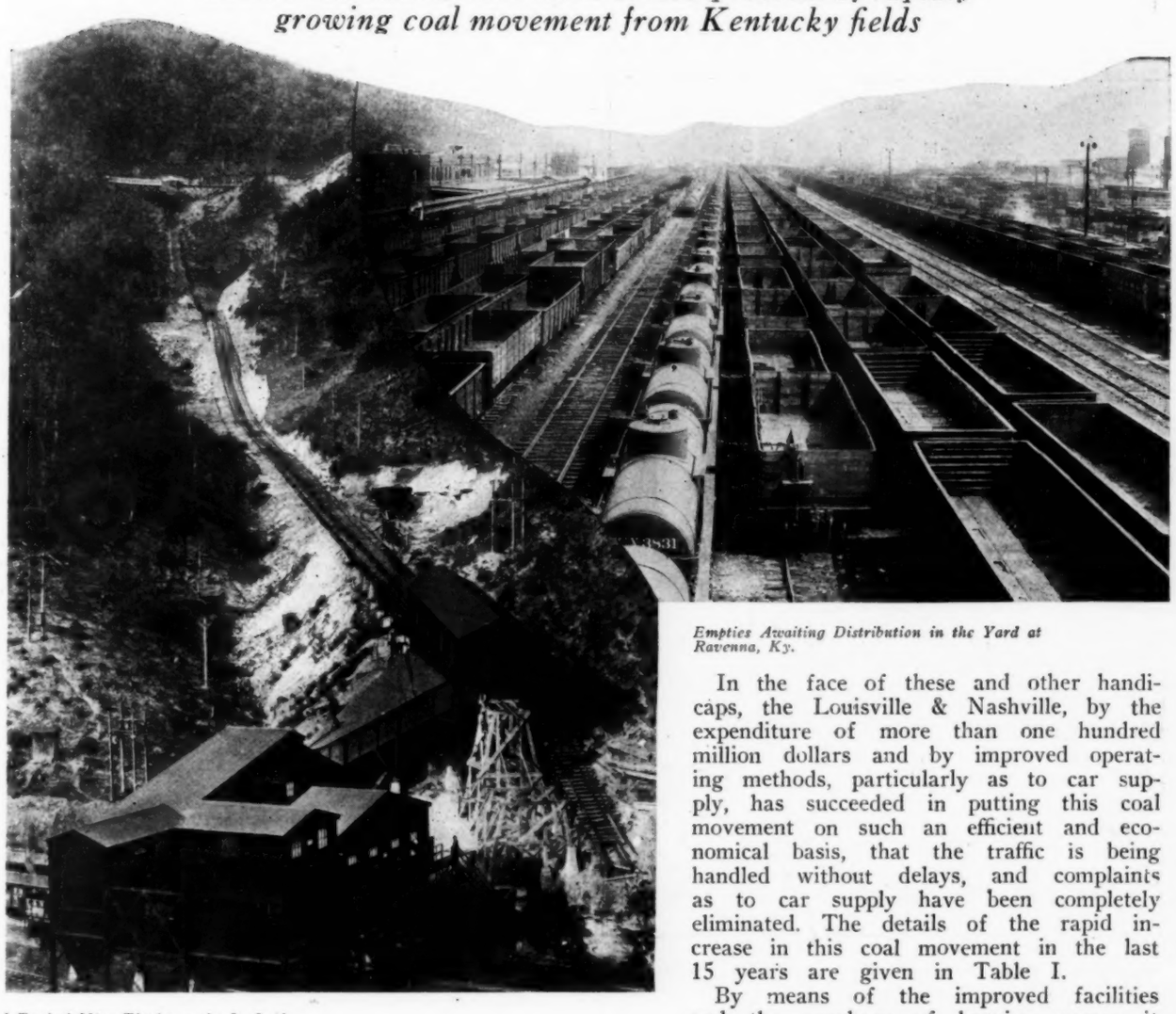
Problems That Must Be Faced

The tendency of the public and regulating authorities to subsidize unregulated competition and apply constant pressure for reductions of rates is a danger to the railroads. The tendency of employees to demand and of arbitration boards to award advances in wages, regardless of earnings, is another danger. There is a third danger of which railway spokesmen say less in public but much in private, and that is the tendency of the railways to resort to cut-throat competition among themselves. This kind of competition takes various forms. Some experienced railway officers say there are more forms of it now than ever before. It usually originates in the traffic departments. It is the function of freight and passenger traffic officials to get business. They naturally put more emphasis on traffic than earnings. But competitive tonnage can be secured at too dear a price; and when it is secured by trading purchases for it, granting costly special privileges, rendering unnecessary service, initiating reductions or preventing advances of rates, it almost always is secured at a net loss to the industry, and usually, in the long run, at a net loss to the railroad whose officers are primarily responsible for what has been done.

While railway traffic is not growing as formerly, it is still growing, and there is enough now and will be in future, as far as anybody can anticipate, to provide the railways with sufficient earnings to cover their operating expenses, taxes and a fair return upon investment, but they are not making sufficient earnings for these purposes now. The percentage of return earned upon total investment in 1927 was the least since 1922, and probably will be still less in 1928. Responsibility for improving the results rests primarily upon the managements. They must deal with the problems presented by the demands of the employees for higher wages and of the public for lower rates, and also with those presented by railroad competition. There does not seem to be any way to deal effectively with problems of the last-named kind excepting by better co-operation between the railways as a whole and between railways of the same group.

Handling 560 per cent Increase in Traffic in 14 Years

How Louisville & Nashville solved problem of rapidly growing coal movement from Kentucky fields



Empties Awaiting Distribution in the Yard at Ravenna, Ky.

A Typical Mine Tipple on the L. & N.

IN 1913, the Louisville & Nashville hauled 4,792 cars of coal from mines on its Eastern Kentucky division. In 1927, this movement amounted to 224,868 cars. A similar increase occurred on the Cumberland Valley division, where the movement grew from 82,670 cars in 1913 to 352,148 cars in 1927. Naturally, this huge increase brought with it a number of operating problems, not only on the divisions originating the movement, but on connecting divisions as well. For several years, the annual increase from each division averaged about 20,000 cars. The facilities became overtaxed and as fast as new ones were built or old ones enlarged, these too became inadequate. The car supply problem became particularly acute and despite the purchase of much new equipment, it continued to present many difficulties.

In the face of these and other handicaps, the Louisville & Nashville, by the expenditure of more than one hundred million dollars and by improved operating methods, particularly as to car supply, has succeeded in putting this coal movement on such an efficient and economical basis, that the traffic is being handled without delays, and complaints as to car supply have been completely eliminated. The details of the rapid increase in this coal movement in the last 15 years are given in Table I.

By means of the improved facilities and the purchase of heavier power, it has been possible to handle this traffic without a corresponding increase in the number of employees. This is apparent from the following table which shows the number of train and engine service employees in August 1923 (the earliest date for which these figures are available) compared with the same month in 1927:

	August, 1923			August, 1927			
Division	Engineers and Firemen	Condrs., Trainmen and Yardmen	Total	Engineers and Firemen	Condrs., Trainmen and Yardmen	Total	Increase
Kentucky	195	275	470	199	365	564	94
Eastern Kentucky...	351	432	783	302	489	791	8
Cumberland Valley..	244	376	620	304	516	820	200

These additional employees were recruited from car-handlers at the mines and from residents along the line. By avoiding the employment of "drifters" the

L. & N. has been able to maintain a higher morale and to secure men who were familiar with the mountain country and could be taught the intricacies of railroading.

The Hazard field is served by the Eastern Kentucky division and the Harlan field by the Cumberland Valley division. The Eastern Kentucky division comprises the lines from Lexington, Ky., and Frankfort, through

How the L. & N. Serves the Eastern Kentucky Coal Fields

Hazard to McRoberts. The Cumberland Valley division includes the line from Corbin, Ky., through Harlan to Lynch, and the branch from Middlesboro, Ky., to Norton, Va.

By far the larger proportion of the coal from both fields moves over the Kentucky division to Cincinnati, Ohio, for delivery to northern lines there. This division comprises the main line between Cincinnati and Corbin, Ky. The coal from the Cumberland Valley division is delivered to the Kentucky division at Corbin and that from the Eastern Kentucky division at Ravenna. A smaller proportion of the coal moves through Louisville. From the Cumberland Valley division, this passes through Corbin to Sinks, then via Lebanon Junction to Louisville, while the movement from the Eastern Kentucky division to Louisville is via Winchester and Lexington. In addition, there is a small movement of coal from the Harlan field to the south, which is also delivered to the main line at Corbin, but moves south from there.

The improved operating methods and the increased facilities are reflected in the operating statistics of the three divisions involved in this movement as shown in Table 2.

New Facilities Needed

The Harlan field has been producing coal for some years, but the movement from the Hazard field is a comparatively recent development. Both divisions serving the Kentucky coal fields are made up in the main of small railways which the L. & N. has acquired from time to time, supplemented by new lines constructed as the business warranted. As the business increased, the L. & N. has kept pace with it by reconstructing and enlarging facilities, building new yards and second track, etc. In addition to the improvements of the coal field divisions, a second track was built from Cincinnati to Corbin, a distance of 187 miles, on the Kentucky division, as described in the *Railway Age* of June 30. It was also necessary to replace existing equipment with heavier units and many additional locomotives and new cars suitable for coal loading, were added. In all, the expenditures for construction and new equipment made to handle the movement from the Hazard and Harlan fields to Cincinnati since 1907 totaled $101,101,778. These detailed expenditures are shown in Table 3.

Cumberland Valley Division Operations

In addition to the construction of second track on the Kentucky division, the main line of the Cumberland Valley division has been double-tracked from Corbin to Harlan, 70 miles. As will be seen from the map some 16 branch lines on this division lead to mines, as well as many spur-tracks from these branches.

Table I.—Car Loading—Eastern Kentucky Coal Fields

Year	Eastern Kentucky Division	Annual Increase	Cumberland Valley Division	Annual Increase
1913	4,792		82,670	
1914	13,729	8,937	82,336	334*
1915	32,712	18,893	85,095	2,759
1916	61,196	28,484	98,826	13,731
1917	73,961	12,765	97,348	1,478*
1918	91,249	17,288	123,089	25,741
1919	93,739	2,490	125,020	1,931
1920	118,683	24,944	153,075	28,055
1921	134,345	15,662	182,592	29,517
1922	149,325	14,980	177,393	5,199*
1923	174,072	24,747	220,555	43,162
1924	185,812	11,740	243,577	23,022
1925	212,189	26,377	300,434	56,857
1926	232,958	20,769	337,427	36,993
1927	224,868	8,090*	352,148	14,721
Totals	1,803,630		2,661,585	

* Decrease.

Much of the coal on this division originates at, or in the vicinity of Harlan, although a considerable tonnage originates on both sides of the district. The coal is assembled by mine switching crews at Chad and Loyall, and moved in solid trains into Corbin, 86.5 miles from Chad and 66.1 miles from Loyall, by Mikado type locomotives, weighing 326,000 lb., with a tractive effort of 61,200 lb. These locomotives handle trains of 5,500 gross tons, with the assistance of a helper over the three-mile, 1.25 per cent, ruling grade between Emanuel and Arkle. Approximately 60 per cent of the coal produced in the Harlan territory moves via the Cincinnati gateway. Of the remainder approximately 25 per cent moves via Louisville and 15 per cent to the Southeast via Knoxville and Atlanta.

There are 18 yards on this division, the two largest being at Corbin, with 3,497 cars capacity, and Loyall, with 1,273 cars capacity. Corbin is the delivery point

to the Kentucky division, as well as the receiving point for empties. The yard there contains two units, one for loaded cars, and the other for empty coal cars and other traffic. All business from the smaller points is classified here, the coal from the Loyall, Wallsend and Chad districts being classified at the concentration point in each case.

The coal from the mines on this division is pre-classified as much as possible before being moved to Corbin. Each of the new yard facilities constructed on this division was designed and is operated so as to relieve that busy yard and, with the reduction in the amount of classification necessary at Corbin, a much freer movement is made possible at that terminal than would otherwise be the case.

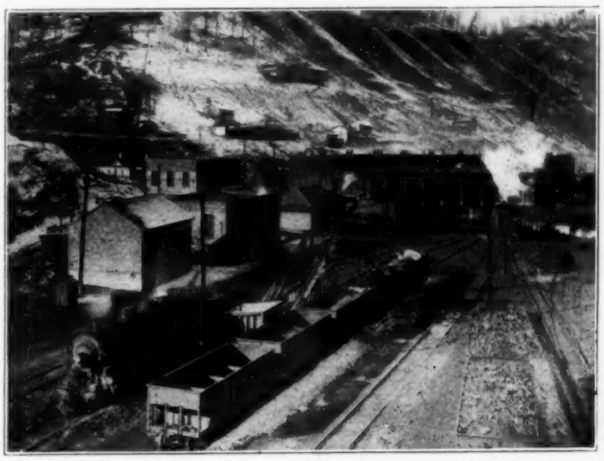
In addition to the three principal concentration points, there are ten smaller points on the Cumberland Valley division where empties are set out and loads assembled. The work of distributing the empties and bringing the loads from the mines is handled by one or two mine crews operating out of these terminals. Depending upon the location, the loads are taken to one or the other of the larger terminals mentioned or picked up by through trains and taken directly to Corbin.

Eastern Kentucky Division Operations

The Eastern Kentucky division comprises the line from Ravenna to McRoberts and includes some 20 branches and mine spurs. Seven yards have been provided for the classification and concentration of coal. The largest of these are at Ravenna and Crawford, a few miles from Hazard, both of which have north and southbound units operated separately, the total capacity at Ravenna being 2,324 cars and at Crawford 668 cars. The greater part of the coal produced on this division originates within 10 miles of Hazard and between Hazard and McRoberts. The coal produced in the Whitesburg-McRoberts district is assembled by mine-switching crews at Neon yard and is then handled in solid trains to Hazard, 55 miles. The coal originating between Whitesburg and Hazard, where the mines are largely adjacent to the main line, is picked up by mine-run and local freight crews and assembled at Hazard. The coal originating in the district immediately surrounding Hazard is also brought into that point by mine-run crews. Depending upon the amount of business moving, the coal from the mines north of Hazard is picked up by local crews, or by through mine crews run for that purpose.

After the coal is assembled at Hazard, it is made up into trains and run through to Ravenna, Mikado type locomotives, weighing 302,000 lb., and with a tractive effort of 57,000 lb., being used in this service. The tonnage rating between Neon and Ravenna is 4,950 gross tons. The road is on a downhill water grade with the exception of five miles of one per cent grade against the loaded movement near Elkatawa, over which a helper is used.

Upon arrival at Ravenna, the coal is classified according to the gateway through which it is to move. About 85 per cent of the coal originating on this division moves via the Cincinnati gateway and the other 15 per cent via Louisville or Evansville.



Engine Facilities at Hazard, Ky.

Kentucky Division Operations

Coal from the Harlan district is delivered to the Kentucky division at Corbin. The coal moving through Cincinnati is handled in solid trains from Corbin to DeCoursey yards, 180.1 miles, by one crew. Mikado locomotives, weighing 320,000 lb., tractive effort 63,000 lb., are used in this service. The tonnage rating from Corbin to Patio is 3,275 tons and the trains are filled out at either Patio or Paris to 5,500 tons. The ruling grade against this loaded movement is 0.65, which obtains over the entire district with the exception of a 1.1 per cent grade between Riverside and Patio, eight miles, where a helper is used. The coal moving through Louisville is run via Sinks and Lebanon Junction.

The line of the Cumberland Valley and Kentucky division is double-track from Harlan, through Corbin to DeCoursey, 246 miles, and with the exception of the ruling grades mentioned, it is practically level.

Cars from the Eastern Kentucky division are handled in solid trains from Ravenna to DeCoursey, 116.9 miles, by one crew. The same type of power is used as between Corbin and DeCoursey. The ruling grade on this movement is 0.45 per cent, between Ravenna and Patio, 26.6 miles, which holds the tonnage rating to

Table 2—Operating Statistics

	Net Ton Miles	Net Ton Miles Per Train Hr.	Gross Ton Miles	Gross Ton Miles Per Train Hr.	Cars Per Train	Gross Tons Per Train	Net Tons Per Train	Net Tons Per Loaded Car
Kentucky Division								
August, 1920	136,077,621	11,324	257,394,748	21,419	44.1	1,830	968	35.9
August, 1927	252,530,199	14,623	483,003,415	27,969	53.7	2,287	1,196	42.3
Increase	116,452,578	3,299	225,608,667	6,550	9.6	457	228	6.4
Per Cent	85.6	29.1	87.7	30.6	21.8	25.0	23.6	17.8
Eastern Ky. Div.								
August, 1920	84,913,616	5,875	159,863,616	11,061	36.7	1,574	836	42.8
August, 1927	173,706,928	8,646	318,257,855	15,842	49.8	2,275	1,242	48.6
Increase	88,793,312	2,771	158,394,239	4,781	13.1	701	406	5.8
Per Cent	104.6	47.2	99.1	43.2	35.7	44.5	48.6	13.6
Cumb. Valley Div.								
August, 1920	55,893,878	4,377	105,840,944	8,288	27.3	1,176	621	40.2
August, 1927	115,767,910	8,218	219,739,048	15,599	38.0	1,672	881	44.5
Increase	59,874,032	3,841	113,898,104	7,311	10.7	496	260	4.3
Per Cent	107.1	87.8	107.6	88.2	39.2	42.2	41.9	10.7

4,120 tons, the trains being filled out to 5,500 tons at Patio. A Ravenna to Lexington turn-around run handles the coal moving through the Louisville gateway, the tonnage rating from Ravenna to Patio being 4,120 tons, and from Patio to Lexington 2,250 tons. These trains carry cars destined to DeCoursey on the head end

The Coal Lines Traverse Rugged Country

which are set out at Patio and used to fill the through trains from Ravenna and Corbin to DeCoursey to 5,500 tons.

DeCoursey Yard

All coal moving through the Cincinnati gateway is brought into DeCoursey yard. This yard is situated along the Licking river, about seven miles south of Cincinnati. It is a double-hump yard, consisting of the following units:

Yard	No. of Tracks	Car Capacity
Northbound receiving	6	504
Northbound classification	17	880
Northbound departure	8	510
Southbound receiving	8	450
Southbound classification	12	1,010

The yard is operated in three tricks, electric floodlights being provided for night operation. The humping engines are equipped with boosters, and push 6,000 tons over the hump at one time.

The coal is classified at this point in accordance with the railway to which it is to be delivered at Cincinnati. The cuts to go to the north bank lines are made up in the classification yard, the departure yard being used only for the temporary storage of cuts when the north bank lines are unable to handle them.

In most cases, the transfer engines pulling these cuts operate over the rails of the northern connections, delivering the cars directly into the various yards in the vicinity of Cincinnati. In return, the north bank lines deliver empties directly to DeCoursey yards, operating their own crews over the line of the L. & N. from Covington to DeCoursey. This reciprocal arrangement is on an engine-mile basis.

The empties are classified at DeCoursey into their various sizes and classes. Some of this equipment is specially assigned and requires separate classification on this account. Trains of empties are made up in the classification yard and run through to Corbin and Ravenna, for distribution from there to the mines.

In all, the L. & N. has purchased 21,669 coal cars to handle this movement. These cars were bought more or less regularly within the past 15 years to take care of the business as it increased. Formerly, periodical car shortages caused some trouble, but they have not existed for the past three years. The car shortage situation was aggravated, during federal control, by an order from the Administration governing the rating of coal mines. While it was intended to remedy the situation, it had the opposite effect. The coal mines were required to report their output and the cars were assigned to them on this basis. However, there was nothing to prevent them from reporting more than their actual output and thus secure more cars. Many of them acted accordingly, in order to be sure of having enough cars, with the result that the shortages were more acute than ever. Another source of difficulty, at times, was the failure or inability of certain northern roads to effect the proper interchange of coal cars.

Three factors have aided in eliminating car shortages. One of these was the issuance by the Car Service Division of the A. R. A. of order C-411, which prohibits the northern lines from using the coal equipment of the Louisville & Nashville and two other roads after it is unloaded. The observance of this rule has brought about a prompt return of empties to the L. & N.

Furthermore, the mine rating is now in the hands of the railway itself. To handle this important task, a mine rating commission was formed, consisting of the assistant to the superintendent of transportation, a trainmaster and a mining engineer. All of these men have had years of experience in the coal fields. Their first step was to go over both the Harlan and the Hazard district mines and arrange a rating on an impartial basis. The commission went into the situation very thoroughly and obtained complete data on each mine. Of course, the situation changes frequently and whenever it appears necessary to change the rating of a mine, one of the members of the commission visits the mine and obtains the necessary information on which to base a revision. Thus each mine is insured of its quota of the equipment available. The results of the commission's work are apparent, the month of February, 1928, affording a good example, as shown in Table 4.

Table 3.—Expenditures in Connection with Moving Eastern Kentucky Coal

Cost of construction of the Wasioto & Black Mountain and branches from Lynch to a connection with the Cumberland Valley division at Harbell, including expenditures for the principal improvements, to June 30, 1927	$7,184,440	
Expenditures for principal improvements on the Cumberland Valley division in Kentucky from the Kentucky-Tennessee state line to Corbin, Ky., including the Corbin terminals from June 30, 1907, to June 30, 1927	5,508,101	
Cost of construction of the North Fork extension of the Lexington & Eastern from Dumont to McRoberts, Ky., and branches, including expenditures for the principal improvements to June 30, 1927	14,707,584	
Cost of construction of the cut-off line from Patio to Ravenna, including expenditures for principal improvements, to June 30, 1927	3,869,027	
Expenditures for principal improvements on the Kentucky division from Corbin to Covington, including DeCoursey terminals, from June 30, 1907, to June 30, 1927, and also including expenditures on uncompleted second track work to that date and the amount authorized to complete second track work	15,514,424.53	$46,783,578.67
Freight locomotives installed (319 units)	15,753,636.81	
Freight locomotives retired (40 units)	547,266.74	15,206,370.07
Switch locomotives installed (50 units)	1,719,324.06	
Switch locomotives retired (62 units)	624,440.94	1,094,883.12
Coal cars installed (21,669 units)	42,030,444.72	
Coal cars retired (5,880 units)	4,013,909.65	38,016,535.07
Grand Total		$101,101,366.93

The large purchases of new cars of greater capacity have, of course, aided materially in reducing car shortages. The L. & N. owned 11,909 coal cars on July 1, 1906, with an average capacity of 36.38 tons. On January 1, 1927, it owned 38,818 coal cars, with an average capacity of 48.22 tons, giving it a total increased capacity of 455,723.32 tons, or 342 per cent.

Table 4.—Summary of Cars Ordered, Supplied and Loaded—February, 1928

Division	Ordered	Supplied	Per Cent Supplied	Loaded
Kentucky	211.0	211.0	100.00	211.0
Eastern Kentucky	19,854.0	19,854.0	100.00	16,388.6
Knoxville	4,233.0	4,233.0	100.00	2,931.0
Cumberland Valley	32,208.5	32,208.5	100.00	27,371.9
Henderson	6,167.0	6,167.0	100.00	4,822.0
St. Louis	861.0	861.0	100.00	470.2
O. & N.	4,897.1	4,897.1	100.00	4,422.1
Alabama	6,817.6	6,817.6	100.00	6,394.4
Total	75,249.2	75,249.2	100.00	63,011.2

Heavier Power Used

One of the important factors in increasing the efficiency with which this movement is handled is the heavy locomotives which it is possible to use as a result of the large expenditures made in building and rebuilding tracks and structures. The following comparisons give a graphic illustration of what has been accomplished.

In 1906, the Kentucky division used class H-9 engines in freight service. These engines weighed 143,000 lb. and had a tractive effort of 27,700 lb. Their rating was 1,000 gross tons. Today, the same service is being taken care of by class J-4 engines, weighing 320,000 lb., with a tractive effort of 63,000 lb., and a rating of 5,500 tons, —an increase of 450 per cent.

In 1911, the Cumberland Valley division used class H-23 engines, weighing 183,000 lb., with a tractive effort of 35,000 lb., and a rating of 1,630 tons. Today, class J-2-A engines are used, weighing 328,000 lb., with a tractive effort of 65,000 lb., and a rating of 5,500 tons, an increase of 237 per cent.

In 1915, the Eastern Kentucky division used class H-18 engines, weighing 164,000 lb., and having a tractive effort of 33,700 lb., with a rating of 2,100 tons. Today, class J-1 engines are being used, weighing 302,000 lb., with a tractive effort of 57,000 lb., and a rating of 4,-950 tons, an increase of 135 per cent in twelve years.

The combination of large expenditures for improved facilities and heavier equipment, taken in conjunction with the more efficient methods of car supply, have made the handling of this traffic relatively simple. This is true even though the movement is seasonal to a certain extent, and coal is loaded in greater volume some months than others.

Western Conductors and Trainmen Vote Upon Strike

Sectional meetings of the Brotherhood of Railroad Trainmen and the Order of Railway Conductors on the western railroads were held on August 14 to vote upon a strike, following the refusal of the two organizations to arbitrate certain differences between them and the western railways during negotiations which started on July 16.

The trainmen and conductors declined further arbitration with the conference committee of managers of the western railways, according to E. P. Curtis, president of the Order of Railway Conductors, on the ground that the issues in dispute have been the subject of four different arbitrations under the railway labor act and have been settled voluntarily by four different conferences between the carriers and the enginemen, conductors, firemen, trainmen and yardmen. "We therefore believe that both the spirit and letter of the law have already been fulfilled and that the matter is not one which should again be submitted to arbitration."

Increase of 7½ Per Cent. Was Sought

In February, 1927, the employees representatives asked for increases in wages for conductors, trainmen and yardmen, equal to 7½ per cent of their present wages. A board of arbitration, after holding hearings at Chicago from April 27 to May 24, denied increases to passenger, local or way freight and through-freight service trainmen, and at the same time awarded an increase of 7½ per cent in wages to car retarder operators, yard foremen, helpers and switch tenders. On November 1 a renewal of the request was filed seeking an increase in daily wages ranging from about 8½ per cent, or approximately 50 cents per man in yard service, to about 19 per cent, or one dollar for men in passenger and freight service. In December, the railroads replied to the request by denying passenger and freight trainmen an increase. During the present negotiations in which John Williams, a member of the United States Board of Mediation has participated, the employees representatives refused to arbitrate.

Attitude of Railways

J. W. Higgins, chairman of the Conference Committee of Managers of the Western Railways issued a statement on August 10, explaining the attitude of the railways as follows:

"The refusal of the Order of Railway Conductors and the Brotherhood of Railroad Trainmen to arbitrate certain differences between them and the western railways creates a situation of great concern to the public. The Watson-Parker Railway Labor Act was passed by Congress only two years ago to afford a peaceable means of settling such differences. It was drafted by representatives of all the railway labor organizations and of a majority of the railways, and its passage was urged by both of them. Persistence by the conductors and trainmen in their refusal to arbitrate would amount to a repudiation of this law.

"On June 25, 1927, an arbitration board formed under the Watson-Parker Railway Labor act made an award in a wage dispute between the western railways and their conductors and trainmen. It held that the fact that employees of these classes on eastern and southeastern lines recently had been granted an increase was no reason why an advance should be granted in western territory, because road conductors and trainmen in road service in the west previously had been earning 6½ to 7½ per cent more than those in the east and southeast, and because, as the roads of the western group were earning relatively much smaller net returns than those of the east and southeast, they could not afford to pay an advance. While refusing an advance to conductors and trainmen in road service, the arbitration board awarded an advance of 7½ per cent to the yardmen of the western lines.

"The award was effective until March 1, 1928, but in November, 1927, the conductors and trainmen renewed their demand upon the western railways for advances. Because of wage negotiations that were pend-

ing between the western railways and their locomotive engineers and firemen, negotiations between the Conference Committee of Managers and representatives of the conductors and trainmen were not begun until July 16. Meantime the firemen secured an advance of 6½ per cent by arbitration, and the engineers accepted a settlement on the same basis without arbitration.

"The Conference Committee of Managers was willing to give the conductors and trainmen increases equivalent to those received by the engineers and firemen, but asked for the elimination of certain rules which are not in effect in any other territory. These are rules arbitrarily restricting the use of more than one locomotive on a train and also the number of cars than may be hauled in a train with two locomotives. They thus restrict the efficiency and economy that may be attained in operation.

"Desiring to effect an early and satisfactory settlement, the Conference Committee of Managers on August 1, after two weeks of negotiation, offered to grant the conductors and trainmen either an advance of 6½ per cent in wages without any change in rules, or an advance of 7½ per cent if they would agree to elimination of the restrictive rules in question. Either offer would raise their wage rates and earnings above the highest in history, that is the rates awarded by the United States Railroad Labor Board in 1920. The representatives of the employees refused to accept either of these propositions but insisted, as a minimum, upon the retention of the rules and an advance of 7½ per cent. As previously stated, the engineers and firemen already have accepted 6½ per cent. It is estimated that, without any change of rules, an increase to the conductors and trainmen of 6½ per cent would cost the western railways $6,500,000 a year, while an increase of 7½ per cent would cost $1,000,000 more.

"Mediation between the two parties has been conducted by the Honorable John Williams, a member of the United States Mediation Board, Mediation having apparently failed, the Conference Committee of Managers asked Mr. Williams to use his good offices to bring about arbitration of the matters still in dispute. What this meant was simply that there should be arbitration as to whether the objectionable rules in question should be eliminated and the employees should be given an advance of 7½ per cent, or the rules should be allowed to stand and they should be granted the same advance as has been received by the engineers and firemen.

"There has been no favorable change in conditions of the western railways since an arbitration board held, on June 25, 1927, that their road service conductors and trainmen were not entitled to any advance in wages. The railways of this territory are still falling far short of earning a 'fair return' and are earning a relatively much smaller return than those of the eastern or southeastern territory. The Conference Committee of Managers has offered the settlement it has with the conductors and trainmen because the engineers and firemen of these lines already have secured increases. It seems clear that the conductors and trainmen are not entitled to larger increases than those received by the engineers and firemen, but the Conference Committee of Managers has even offered to leave to arbitration the remaining question in dispute.

"In refusing to accept the actually generous offer of arbitration made by the Conference Committee of Managers the representatives of the conductors and trainmen have acted in plain disregard of the spirit and thereby are imperilling its usefulness as a means of peaceful settlement of wage controversies between railways and their employees."

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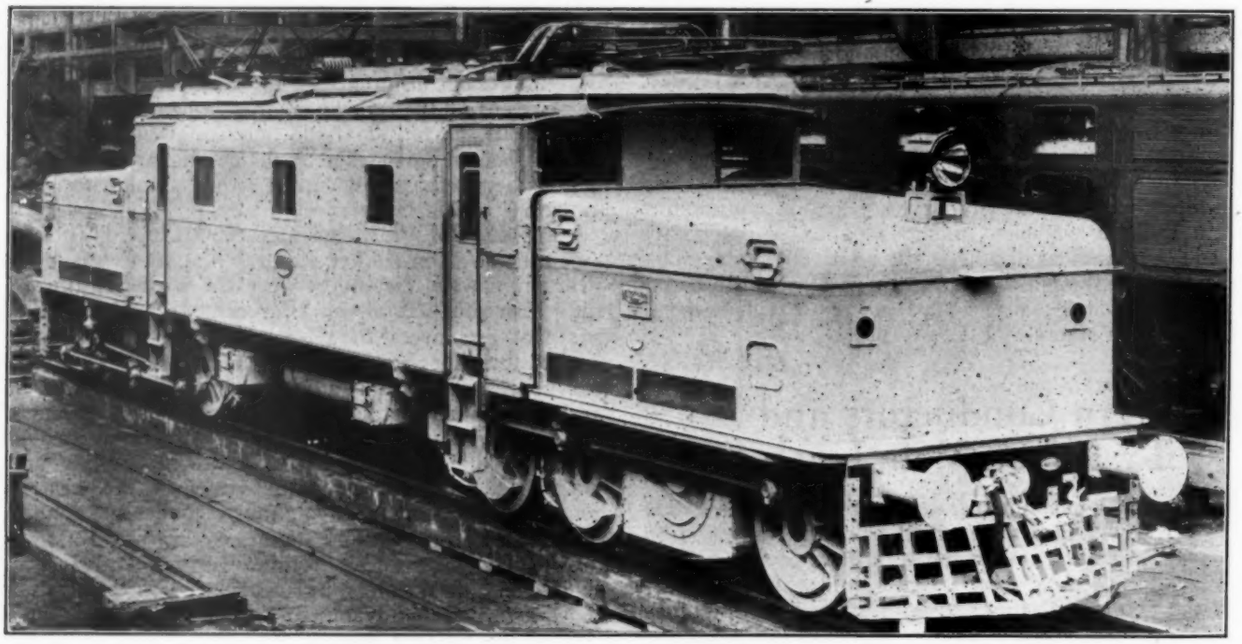


One of the Forty-One Electric Freight Locomotives Built By the Metropolitan-Vickers Electrical Company, Ltd., Manchester, England, for Service on the Main Lines of the Great Indian Peninsula Railway

This type of locomotive which will operate from a 1500-volt overhead line weighs about 120 tons and will develop 2600 hp. The mechanical parts for the first ten of these locomotives are being constructed by the Swiss Locomotive Works of Winterthur, Switzerland, and those for the remaining thirty-one, by the Vulcan Foundry, Ltd., of Newton-le-Willows, Lancashire, England. The electrified section of the Great Indian Peninsula Railway extends from Bombay, India, to Igatpurr and Poona, a distance of 118 miles.

Arch Crossing Over Boulevard Presents Unique Problem

Steel falsework carried on the embankment supported four main tracks during construction of a 71-ft. arch on the New Haven

The Nearly Completed Arch Under the Four Main Tracks of the New Haven

ALMOST interesting and effectively conducted grade separation project has recently been completed on the New York, New Haven & Hartford, wherein a new full-centered, two-hinge, reinforced concrete arch of 71½-ft. span was constructed under four high-speed, heavy traffic tracks without mishap and with practically no interference to traffic. This work, which extended over a period of about 17 months, was done near Pelham, N. Y., on the main line of the New Haven, where a new county parkway is being constructed, which is expected to carry under the railway, from 10,000 vehicles on week-days to 25,000 vehicles on Sundays.

With this heavy highway traffic, the importance of this under-crossing from a railway operating standpoint is apparent, and the more so, when it is known that the New Haven at this point carries a total traffic of 93 through express trains, 75 local commutation trains and 4 freight trains daily. From the standpoint of construction, the new undercrossing is of particular interest, since the heavy rail traffic encountered necessitated the adoption of unusual expedients. This was necessary, for it was evident that nothing could be permitted to interfere seriously with this high class traffic, which carries approximately 1½ million passengers into the Grand Central Terminal each month. So effective were the measures taken in carrying out this work, that throughout the entire period of construction, there were only six days when it was necessary to divert traffic from any of the tracks, and there was also little interference to the construction work by reason of the frequent train movements.

High Embankment Made Large Arch Possible

This problem arose when the Westchester County Park Commission undertook to extend the new Hutchinson River parkway through Westchester County, New York, to relieve congestion to and from New York City. At the point where it crossed the railway, the embankment is approximately 55 ft. high and about 240 ft. wide at the base, and consists of sand and large stone. The natural ground in the vicinity of the undercrossing is low and marshy, and this, together with the necessity of maintaining uninterrupted traffic on the railroad, presented a number of difficult problems.

The Commission desired to construct an architecturally pleasing structure, which would harmonize with the other attractive structures planned or already completed throughout the new parkway. This requirement was met by the construction of a full-centered reinforced concrete arch, with a three-foot arch ring, and with the spandrel and wing walls at both portals faced with quarry faced ashlar stone masonry. To add further to the appearance of the arch, the arch at the portals is faced with cut granite voussoirs, and flanked by heavy pilasters of stone masonry that extend above the coping of the parapet in the form of towers. This latter feature not only greatly enhances the appearance of the undercrossing, but also provides four safety bays at the track level for the protection of railway employees.

As it was not thought desirable to construct the parkway at the general low level of the ground in the vicinity of the undercrossing, the finished grade of the roadway was fixed at an elevation of about eight feet above the surrounding level. This necessitated the placing of the arch at a higher level, which resulted in reducing the cover over the arch at the crown to only four feet, measured from the base of the track rails.

Steel Falsework Carries Tracks During Construction

The method employed in the conduct of the work consisted primarily of underpinning the four railroad tracks, supporting them on girders and steel trestle bents while the arch ring was being constructed. This involved, in reality, a five-span viaduct for each track. These trestles were similar in construction, having central spans of 21 ft. located symmetrically over the center line of the arch, flanked on each side successively by a 44-ft. span and a 30-ft. 6-in. span. The particular span lengths were selected to fit in with the plan adopted for constructing the arch.

In constructing trestles, the ends of the 21-ft. center spans were supported on bents of sufficient length to extend below the soffit of the finished arch, and the

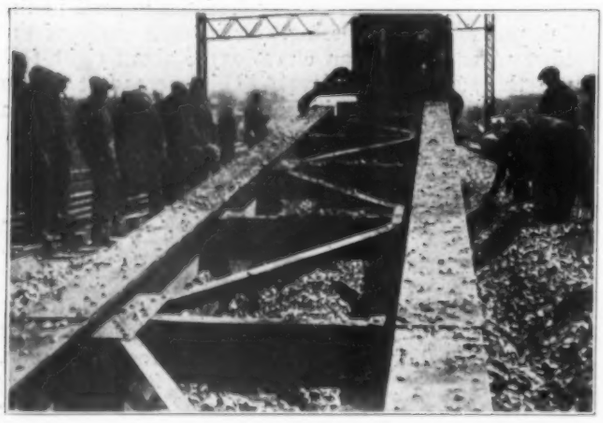
far ends of the adjacent 44-ft. spans on bents, which fell well outside the limits of the arch foundation. In carrying out this plan the steel was first put in place and made to take the entire load of the railroad, following which only sufficient excavation was made beneath the tracks to permit the complete construction of the

Rebuilding the Track on the New Roadbed

arch ring and footings. In other words, the earth in the core of the arch was not disturbed, other than to round it off to conform with the general shape of the arch soffit. In so doing, the unexcavated material of the embankment in the core of the arch formed a foundation for the trestle bents of the short central spans, and at the same time, a surface from which the arch centering could be effectively braced with minimum staging and bracing. When the arch ring was completed, the backfill was put in place, the steel was removed and the full loading of the railroad transferred to the arch.

Work Was Carefully Detailed and Carried Out

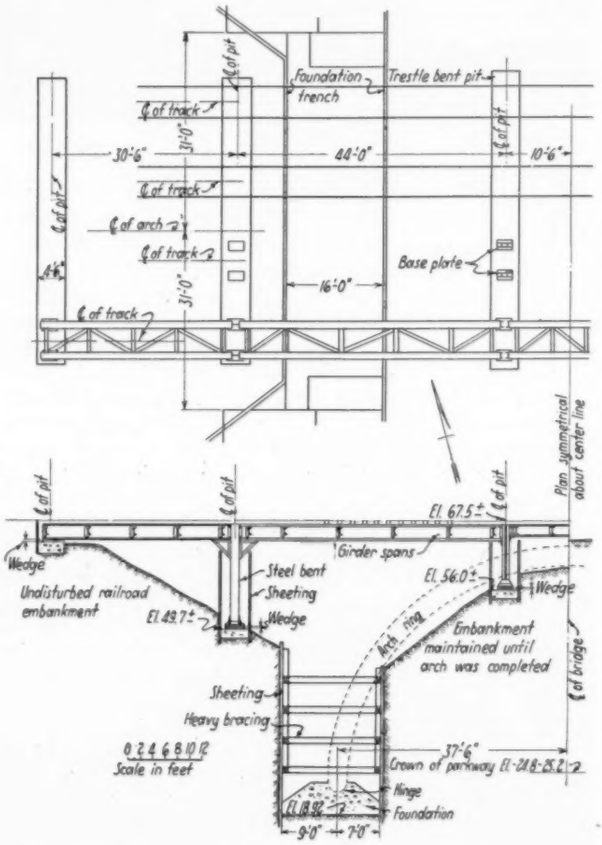
The first actual step in the construction of the undercrossing was the placing of the trestle bents beneath each of the four tracks. As these were to lay directly beneath the tracks, continuous trenches were excavated



Withdrawing One of the Girders After Completing the Arch Backfill

transversely across the top of the embankment to permit the casting of the concrete footings for the various bents. These footings were made as a continuous heavily-reinforced concrete slab extending across the embankment. With the continuous footings in place, the next step was to set and anchor the steel base plates for the bents. While all of this work was under way, the tracks were carried over each trench on heavy timbers.

On the first Sunday following the completion of the work already mentioned, one of the tracks was taken out of service for a period of about 12 hours, and during this time, the rails, ties, ballast and sub-grade were removed throughout the length of the proposed viaduct, so that there was a clear longitudinal trench in the track of sufficient depth to clear the girders to be placed. Immediately following this work, which was carried out by railway forces with the assistance of a locomotive crane, the same crane set the steel bents and the five girder spans for the trestle, these having been assembled previously along the right-of-way. The spans were set in order from one end, and



How the Falsework Was Carried on the Embankment

as each span was placed it was immediately bolted to the supporting bents and provided with an open bridge deck so that the crane could operate over it in placing the next span beyond. In this way only one track was obstructed during all of these operations, and when the day's work was completed, the roadbed had been replaced with an open-deck steel viaduct capable of carrying main line traffic at only slightly restricted speed.

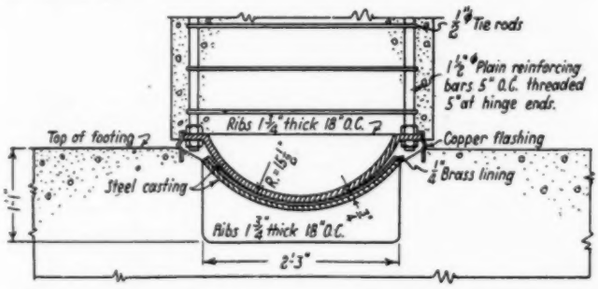
Following this same method of procedure, the three remaining viaducts were placed on the two succeeding Sundays, which then made it possible to excavate beneath the tracks for the construction of the arch ring. Practically all of this first excavation was done by hand

shovels, the excavated materials being hauled to the sides of the embankment in small tram cars.

Lateral Pressure Necessitated Care In Excavating for Foundations

The greatest difficulty was encountered in connection with the excavation for the arch foundations. At these points, two rows of heavy wooden sheeting were driven about 16 ft. apart, extending across the full width of the embankment. As the excavation was carried down, severe lateral pressure on the sheeting, induced by the heavy concentrations on the nearby bent footings, made it necessary to install heavy bracing of wales and struts, but this was effected without difficulty other than the obstruction which it presented to the removal of the excavated material and the pouring of the arch. In this manner full excavation was made for the arch foundation and arch ring without regard to the overhead traffic other than the necessity of wedging up the trestles from time to time when settlement was in evidence.

Following the excavation, the forms and the reinforcing steel were erected for the arch foundations and these were poured, provision being made for the particular type of hinge joint adopted. This joint, which is designed to permit such slight movement as may occur in the arch due to expansion and contraction, consists of a concave steel casting, ¾ in. thick and the full length of the arch, which receives a mate steel casting, 1 in. thick, bolted to the arch ring at the springing line. These two castings are separated by a ¼-in. brass lining.

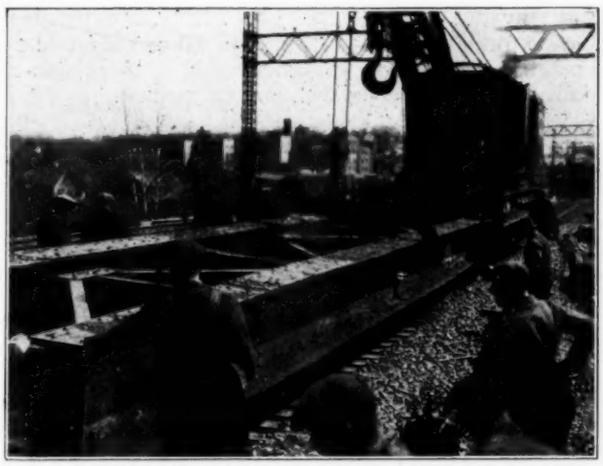


A Cross Section of the Hinge at the Springing Line of the Arch

Construction of the arch ring, buttresses and wing walls was accomplished in much the same manner as the foundations, as much of the concrete as possible being chuted into place from a tower located at one side of the embankment. Where this was impossible, owing to the lack of head room, as was the case near the crown of the arch, it was necessary to convey the concrete to the forms in concrete carts and wheelbarrows. In pouring the arch ring, the only break in continuity occurred at the points where the viaduct columns of the center spans extended through the ring to their support on the material in the barrel of the arch. At these points, forms were built around the columns so that they could be withdrawn later and the openings were then filled with concrete.

All of the concrete used in this work, which amounted to about 2,160 cu. yd. consisted of a 1-2-4 mix, the amount of water being kept to a minimum consistent with the degree of workability desired. The concrete was prepared in a mixer located at the crown level of the arch on the south side of the tracks. Aggregates for the concrete were measured at the road elevation, and dry batches were raised to the mixer by a derrick. The mixed concrete was either wheeled into place or allowed to flow through chutes where this latter practice was possible.

As soon as the concrete in the arch ring had developed its full strength and the spandrel walls had been completed at each end, the back of the arch ring was thoroughly waterproofed with membrane waterproofing and backfilling was begun. This was attempted in a number of different ways, but was finally carried out by sluicing the material into place. This method proved effective, but it was expensive and was adopted only as the best alternative for dumping the filling material from the main line tracks, which method was not feasible because of the traffic conditions.



Moving One of the Spans Into Position

In taking care of the trestle columns extending through the arch ring, it was originally the intention to concrete them in solid as the ring was poured, and later to burn off the projecting ends within the arch.

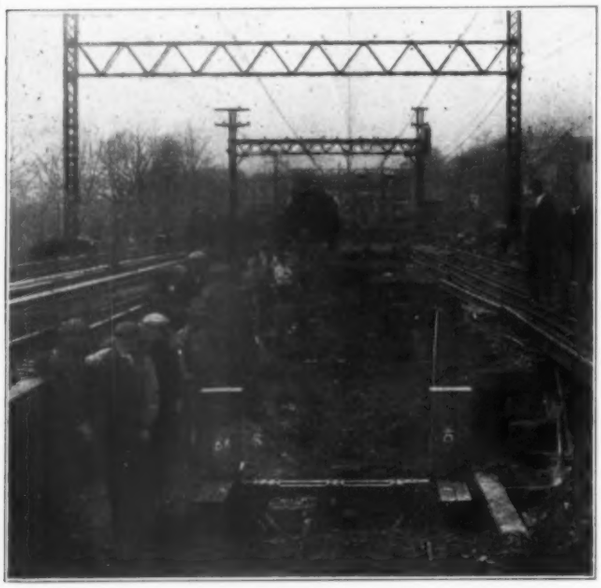
View Under the Tracks Directly Over One of the Arch Foundation Trenches

However, this meant the destruction of the columns and delay in excavating the embankment material beneath the arch until the backfilling was completed and the steel trestles were removed. In order to overcome these disadvantages, the columns were surrounded by forms, as already mentioned, and while the backfilling

was in progress, temporary cribbing was built up between the ends of the girder spans and the arch ring at the column supports, and the entire track load was transferred to the arch ring. Relieved of the load, the columns were withdrawn from the arch and the openings in the ring were filled with concrete. This made it possible to proceed with the excavation of the material in the arch down to the sub-grade of the parkway drive while backfilling of the arch was in progress. Owing to the large rise of the arch, which permitted the operation of a steam shovel beneath it, there was no difficulty in completing this final excavation.

Permanent Roadbed Was Restored In Three Working Days

When backfilling of the arch had reached the level of the bottom of the track girders and had become stable, there remained only the replacing of the girders



The Falsework Bents in Position Ready to Receive the Girder Spans

with a solid roadbed, the reconstruction of the tracks, and a few minor finishing touches on the arch. Following the practice adopted in placing the girder spans, the work of removing them was undertaken on Sundays, one track being completed at a time. At the appointed time, a work train dumped rock ballast into the roadbed, completely submerging the girders, following which the rails and bridge ties were removed from one span at a time, and a locomotive crane withdrew the girders through the deep section of ballast previously deposited. With the girders out, the track structure was relaid and the track opened to traffic under a temporary slow order. In like manner a permanent roadbed was restored under the remaining three tracks.

This work, which cost in the neighborhood of $375,000, was carried out and paid for by the park commission under the direction of Jay Downer, Leslie G. Holleran, and Edward Anderberg, chief engineer, deputy chief engineer, and division engineer respectively of the Commission. All operations affecting the railroad tracks, including the placing and removing of the temporary girder spans, were assisted by railway forces and were carried out under the general supervision of Edward Gagel, chief engineer, and P. B. Spencer, engineer of structures of the New Haven. The general contractor was the Suburban Engineering Company, New York.

N. Y. C. Uses New Indicator

FOR the greater convenience of its passengers, the New York Central has installed at the Grand Central Terminal, New York, a new type of track indicator provided with a special panel for the posting of Pullman car numbers. Heretofore, car numbers were posted on a board hung across the lower part of the indicator rolls. This served the purpose so long as the list of station stops did not extend down to the bottom of the roll, in which event, the auxiliary board obscured the names of some of the station stops. This proved unsatisfactory and a new track indicator was designed in which was included at the side a panel in which the Pullman car numbers can be readily posted.

The New Track Indicator, Showing How the Pullman Car Numbers are Posted

The numbers are now placed in a wooden roll type of endless rack. This rack is pulled down until the space in which the word, Pullman, is posted strikes a stop at the bottom of the panel. The numbers and letters, which are made of hard rubber, contain grooves in the top and bottom, which readily permit the blocks to be slipped into position in the rack. The blocks are kept in a partitioned compartment immediately below the car number indicator. The curtain rolls, on which are painted in large letters the necessary information pertaining to the departing train, are slipped into fixtures similar to those used for hanging a window blind. Two hooks, which are fastened to the loose end of each roll, are slipped over one of the many hooks on two endless chains which pull the rolls up into position. The rolls are elevated into position by means of the customary gears and crank handle. Three panel doors that swing outward are located immediately below the indicator roll. Four rolls are held in place on the back of each of these panels.

Ten single and four double indicators have been installed on the upper level of the Grand Central Terminal, from which most of the through trains depart.

Northern Pacific Earnings Improve

Road increases net consistently, with traffic volume lower than war years and low return on investment

THE Northern Pacific in the first six months of the current year had net railway operating income of $7,634,129, an increase of 33 per cent over the first half of last year and even exceeding slightly the same figure for the first half of 1926, which last entire year had the best showing in net railway operating income of any year since federal control. In 1927 the road's net after charges was $18,538,424, a decline of $2,464,308 from the preceding year, but still enough to be the equivalent of $7.47 a share on capital stock, on which 5 per cent dividends were paid.

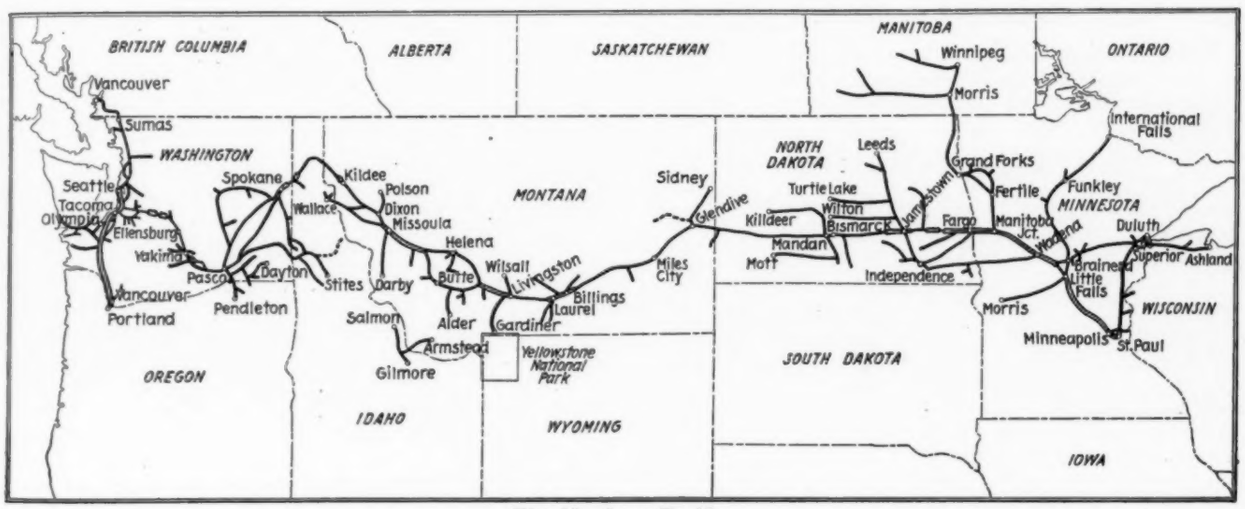
Earnings Less Than 4 Per Cent on Investment

The Northern Pacific offers an excellent example of how substantial a road may maintain itself in spite of unfavorable conditions, the road has succeeded in steadily increasing its earnings since the federal control period (Table I). A low mark was reached in 1923 with net after charges of $12,981,426. In 1926 the total of $21,002,732 was attained. As previously noted, 1927 showed some recession from this figure, but the current year is again registering an increase.

Ready to Handle More Traffic Profitably

The road, by its war record, has shown how much traffic it can handle. It is not being called upon to handle so much now. Plainly, therefore, its excess capacity being what it is, any traffic increase, however slight, should tend to bear much more effectively upon net earnings than a similar increase on a road handling business close to the limit of its existing facilities.

Pending a sharp upturn of traffic, however, the great obstacles, provided it is conservatively capitalized, efficiently operated and its management alert to spend money where possible to effect economies and improve service. The 1927 income, sufficient to pay all dividends and leave a balance of $6,138,424 for surplus, was derived from earnings equivalent to less than 3.65 per cent on the capital investment, and in no year since federal control have earnings on the investment reached as high as four per cent.



The Northern Pacific

Road Prospers Despite Loss of Traffic

The Northern Pacific has been doubly afflicted with low rates and the loss of traffic and yet has been able to go ahead, serving its patrons well and paying steady, though not extraordinarily high, dividends (5 per cent since 1922) to its owners. Freight traffic as measured in revenue ton-miles has in no year since 1920 exceeded the total which was reached that year. As a matter of fact, in no one year since 1920 has traffic reached seven billion revenue ton-miles, which figure was exceeded every year from 1916 to 1920. Revenue ton-miles handled in 1927 totaled 6,571,474,000; in 1918 the figure was 9,589,273,000. Yet in the face of these management of the property has demonstrated that it is still possible to affect net earnings favorably by new methods and improvements designed to handle existing business more efficiently. What was done in this regard between 1923 and 1927 is shown in Table II. The road handled virtually the same gross ton-miles in the latter year that it did in the former, but with a saving of approximately 12 per cent in freight train-miles, 10 per cent in freight locomotive-miles and almost 15 per cent in freight train-hours. There was an increase of 9.7 per cent in the number of freight cars per train, 10.7 per cent in gross tons per train and 15.7 per cent in gross ton-miles per train-hour.

Saving in Fuel Costs

One figure in Table II, that of pounds of coal per thousand gross ton-miles, ordinarily taken as an index of fuel efficiency, is in this case misleading. The table shows an average consumption of 144 lb. in 1927, as against 133 lb. in 1923. The reason for this increase is a change in the kind of coal consumed. Formerly higher grades were used, but in recent years the company has undertaken to utilize local coal of lignite

characteristics which can be mined cheaply. This coal, a high-grade sub-bituminous, does not have a high thermal efficiency, but its relative economy is shown by the fact that, although consumption per thousand gross ton-miles increased in this five-year period, *fuel cost* per thousand gross ton-miles actually declined 31 per cent.

The road's operating ratio, together with its more important component parts, in the past five years has been as follows:

Ratio to Operating Revenues

	Maintenance of Way and Structures	Maintenance of Equipment	Transportation	Operating Ratio
1923	13.7	22.0	37.8	78.8
1924	12.8	19.6	35.9	74.0
1925	13.0	18.0	34.3	71.5
1926	12.6	17.9	33.2	70.1
1927	12.5	18.7	33.4	71.1

It will be noted that while the ratio of maintenance of way expenses to operating revenues has been fairly constant, the ratios of maintenance of equipment expense and the operating ratio have tended to decline. That this was not particularly marked in 1927 may be explained by the fact that there was a drop in revenues that year which could not be met by a proportionate decrease in these two items.

Locomotive Condition

The following tabulation gives the classification of locomotives owned by the Northern Pacific in 1923, as compared with 1927, showing the average tractive power of each class:

Locomotives Owned

Type	Number 1923	Average Tractive Force	Number 1927	Average Tractive Force
0-4-0	1	9,070	....	.....
0-4-2	1	7,900	....	.....
0-6-0	147	30,043	141	30,237
0-8-0	38	41,887	34	43,856
2-6-0	58	18,638	20	18,770
2-8-0	135	36,853	108	37,261
2-10-0	2	34,800	2	34,800
4-4-0	40	14,398	19	14,926
4-6-0	230	27,545	130	28,815
4-8-0	4	32,500	4	32,500
4-4-2	6	21,517	5	22,180
4-6-2	182	33,835	182	34,382
2-6-2	144	33,324	137	33,623
2-8-2	386	50,848	384	53,909
4-8-4	....	.....	12	61,600
2-6-6-2	22	64,936	12	62,800
2-8-8-2	30	91,873	30	91,873
Total	1,426	37,930	1,220	41,236
	4.21% oil burners 50.07% with superheater 9.54% with stokers		1.72% oil burners 66.07% with superheater 23.11% with stokers 3.11% with boosters	

It will be noted that in the five-year period the company relieved itself of maintenance charges on 226 units by retiring the lighter power and buying heavier, by which process it increased the average tractive power 8.7 per cent, which undoubtedly must have influenced favorably, not only the equipment maintenance ratio, but the transportation ratio as well. Freight cars owned increased from 46,988 in 1923 to 49,494 in 1927; total freight car capacity increased in the same period from 1,859,105 tons to 2,002,860 tons, the average capacity rising 7.7 per cent to 40.47 tons.

The percentage of freight locomotives unserviceable, 23.3, as shown in Table II, undoubtedly reflects the excess power the road has available with traffic at its present volume. Under such conditions it is often better to hold the older and smaller of such locomotives in reserve without going to the expense of repairing them until it is known that they will be needed.

Table II. Comparison of Selected Freight Operating Statistics

	1927	1923	Per cent of change Inc.	Dec.
Mileage operated	6,487	6,415	1.1	
Gross ton-miles (thousands)	17,734,884	17,968,016		1.3
Net ton-miles (thousands)	7,911,211	8,075,295		2.0
Freight train-miles (thousands)	9,819	11,008		11.7
Freight locomotive-miles (thousands)	10,999	12,224		10.0
Freight car-miles (thousands)	456,826	465,685		1.9
Freight train-hours	772,712	905,621		14.7
Tons of coal consumed by freight locos.	1,450,192	1,355,190	7.0	
Car-miles per day	27.1	30.5		10.0
Net tons per loaded car	24.9	26.0		4.2
Per cent loaded to total car-miles	69.5	66.6	4.4	
Net ton-miles per car day	469	530		11.5
Freight cars per train	47.5	43.3	9.7	
Gross tons per train	1,806	1,632	10.7	
Net tons per train	806	734	4.4	
Train speed, miles per train hour	12.7	12.2	4.1	
Gross ton-miles per train-hour	22,951	19,841	15.7	
Net ton-miles per train-hour	10,238	8,917	14.8	
Lb. coal per 1,000 gross ton-miles	144	133	8.3	
Loco. miles per loco. day	48.5	46.8	3.6	
Per cent freight locos, unserviceable	23.3	22.0		5.9
Per cent freight cars unserviceable	7.0	8.6		18.6

This is true since, by the time traffic increases to the point where extra power will be needed, it may be more economical to retire the older power and purchase new, in which case money spent for repairs would have been wasted.

Consistent Maintenance Policy

The figures of rail, tie and ballast renewal show a consistent policy of track maintenance. From 1923 to 1927 the Northern Pacific increased its track mileage of 130-lb. rail by 45 miles, its mileage of 100-lb. rail by 605 miles, reducing its mileage of 90-lb. rail by 351. Of all the road's main line mileage, 88 per cent is laid with rails 90-lb., or heavier, and over half of all tracks have this as the minimum weight of rail. Sixty per cent of its main line ties and 56 per cent of those used in branch lines are creosoted.

Application of ballast and ties has progressed as follows during the past five years:

Year	Miles Reballasted	Ties Inserted
1923	286.5	1,774,169
1924	150.8	1,757,681
1925	177.0	1,882,186
1926	254.6	1,618,456
1927	252.1	1,648,504

Additions and Betterments

In the past five years the Northern Pacific has undertaken many improvements which have had a bearing on its operating performance and service. Among them may be mentioned the following:

Table I—Northern Pacific Operating Results, Selected Items, 1916 to 1927

Year	Mileage	Revenue ton miles (thousands)	Revenue passenger miles	Revenue per ton mile cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges
1916	6,508	7,721,586	591,521,000	0.771	80,281,343	43,232,278	37,049,065	53.85	33,446,012	26,948,011
1917	6,523	8,812,675	660,713,000	0.741	88,225,726	53,297,861	34,927,865	60.41	30,491,140	29,502,686
1918	6,599	9,589,273	672,985,000	0.819	102,908,259	73,850,968	29,057,291	71.76	24,217,342	20,129,334
1919	6,592	7,589,036	748,636,000	0.961	100,739,354	78,672,509	22,066,845	78.10	14,368,479	22,836,737
1920	6,653	7,852,848	719,446,000	1.033	113,084,408	100,983,874	12,100,534	89.30	7,949,458	19,094,183
1921	6,658	5,289,784	505,702,000	1.309	94,538,059	77,630,867	16,907,192	82.12	10,843,826	22,065,399
1922	6,641	6,021,159	473,992,000	1.191	96,076,066	72,654,711	23,421,355	75.62	19,450,514	15,056,930
1923	6,669	6,854,337	479,515,000	1.132	102,002,060	80,364,810	21,637,250	78.79	17,100,557	12,981,426
1924	6,680	6,548,671	413,117,000	1.121	95,292,404	70,533,064	24,759,340	74.02	19,861,077	15,970,244
1925	6,694	6,751,142	426,515,000	1.130	97,864,555	69,972,476	27,892,078	71.50	22,227,319	17,944,288
1926	6,682	6,639,160	406,628,000	1.148	97,351,042	68,260,944	29,090,098	70.12	24,213,700	21,002,732
1927	6,670	6,571,474	379,991,181	1.148	95,574,816	67,854,739	27,720,078	71.00	22,592,837	18,538,424

Standard return for operations during federal control, $30,057,760.

A great increase in the mileage of automatic signals—as much as 288 miles in a single year.

Line changes at Phileman, Mont., Tacoma, Wash., and Lincoln Hill, Minn.

Line change and new bridge built across the Mississippi at Minneapolis.

New power plant facilities provided at Mandan, N. D., Brainerd, Minn., and Glendive, Mont.

New line constructed into the Rosebud coalfields. Other new lines built from Oro Fino, Id., to Headquarters; Elma, Wash., to Shelton, and Glendive to Brockway.

Bitter Root branch relocated.

A 28-stall enginehouse built at Missoula, Mont., and engine terminal facilities at Glendive, Mont.

A number of modern water-treating plants installed.

Bridges improved between Big Horn, Mont., and Granite, Id.; between Ahsahka, Id., and Tacoma, Wash., and at Townsend, Mont.

New freight terminal built at Spokane.

Ore dock at Superior, Wis., extended.

The above list is not complete, but it serves to show the sort of work which is being done constantly to effect a steady improvement in service and the efficiency with which the property is operated.

Improved Operating Methods

Along with these improvements the road has also studied its operating methods intensively and has been able to make some important revisions which have had a favorable effect on its expenses. Two articles have recently been published (*Railway Age*, January 21, page 195, and May 19, page 1142) dealing with some of these improvements, particularly the savings effected by closer surveillance of yard performance and the elimination of four intermediate terminals by the extension of locomotive runs.

In passenger service, also, the railroad has economized by substituting rail motor cars for steam trains on a number of runs and has joined with other roads in pooling passenger service between the Twin Cities and the Head of the Lakes and between Portland and Seattle.

Diversified Traffic

Table III gives details concerning the diversification of the Northern Pacific's traffic and the changes in relative volume which have occurred in the past five years. It will be noted that the diversification is rather striking and that, barring the natural fluctuations in agricultural products which depend upon crop yields, the past few years have brought relatively little change, with the exception perhaps of an upward tendency in the relative importance of bituminous coal and manufactures, and possibly a downward trend in forest products.

Table III. Revenue Freight—Percentage of Important Commodities and Classes to Total Tonnage

	1923	1924	1925	1926	1927
Grain	10.8	14.1	11.3	8.8	11.9
Fruits, Vegetables	1.4	3.0	3.5	3.7	3.4
Total Products of Agriculture	19.8	23.5	20.8	18.0	21.1
Products of Animals	1.5	1.6	1.8	2.1	1.7
Bituminous Coal	13.2	13.7	14.2	14.8	15.3
Ores	6.1	5.7	4.6	5.0	4.7
Products of Mines	25.2	25.1	24.4	26.3	25.8
Products of Forests	39.8	36.3	38.0	38.4	36.8
Mfg. & Misc.	11.2	11.1	12.4	12.9	12.2
L. C. L.	2.5	2.4	2.6	2.4	2.3

Total Revenue Tonnage in 1923 was 24,133,001; in 1924, 23,991,532; in 1925, 22,407,726; in 1926, 22,984,526; and in 1927, 23,102,319.

In common with all railroads, the passenger earnings of the Northern Pacific continue to decline. Passenger train revenues in 1927 were $16,348,667 in 1927, a decline of almost 6 per cent from the preceding year. The decline since 1920 in these revenues has reached 40 per cent. The road is meeting the issue as best it can by giving a superior service in that field in which the railroad can best compete—namely, the long haul passenger traffic—and has been one of the pioneers in arranging a co-operative air-rail service.

Passenger train revenues in 1927 were 17 per cent of total operating revenues.

Non-operating income in 1927 (mostly dividend income from stock ownership in the Burlington and other controlled roads) totaled $11,435,064—approximately 33.6 per cent of gross income.

There were no important financial developments during the course of the year, except a slight reduction in the outstanding funded debt. The profit and loss credit balance at the close of the year stood at $175,242,480 and corporate surplus at $193,050,628.

Timber Preservation Shows Growth

THE amount of timber treated by preservatives in the United States during 1927 established a new high record of 345,685,804 cu. ft., an increase of 54,463,725 cu. ft., or 19.5 per cent, as compared with the output in 1926. This represents an increase of slightly more than 100 per cent over the total for 1922. As usual, cross ties constituted the largest single item in the classification of timber treated, amounting to 74,231,840 ties, a new high record, and an increase of 18.5 per cent over the previous record year of 1926. These are the high lights in the Statistics on Wood Preservation in the United States in 1927, prepared by R. K. Helphenstine for the Forest Service of the United States Department of Agriculture, in co-operation with the American Wood-Preservers' Association.

Only Two Classifications Show Decreases

In tabulating these statistics, which have been compiled since 1909, the timbers treated by preservatives are divided into seven classifications according to their uses. Cross ties, for which the figures are given above, constitute by far the most important class, accounting for almost two-thirds of the total volume, followed by poles and construction timbers in the order named. Both of these latter classes also established record quantities in 1927, poles treated amounting to 64,028,607 cu. ft. as compared with 49,511,089 cu. ft in 1926, an increase of 29 per cent, while 32,544,996 cu. ft. of construction timbers were treated, as compared with 31,147,287 cu. ft. in the previous year. Piles, which represent the fourth class in the order of magnitude, showed a decrease of about 6 per cent as compared

Wood Preservation, 1909-1927, Together With Consumption of Creosote and Zinc Chloride

Year	Total Material Treated, Cu. Ft.	Number of Cross Ties Treated	Creosote Used, Gal.	Zinc Chloride Used, Lb.
1909	75,946,419	20,693,012	51,426,212	16,215,107
1910	100,074,144	26,155,677	63,266,271	16,802,532
1911	111,524,563	28,394,140	73,027,335	16,359,797
1912	125,931,056	32,394,336	83,666,490	20,751,711
1913	153,613,888	40,260,416	108,378,359	26,466,803
1914	159,582,639	43,846,987	79,334,606	27,212,259
1915	140,858,963	37,085,585	80,859,442	33,269,604
1916	150,522,982	37,469,368	90,404,749	26,746,577
1917	137,338,586	33,459,470	75,541,737	26,444,689
1918	122,612,890	30,609,209	52,776,386	31,101,111
1919	146,060,994	37,567,927	65,556,247	43,483,134
1920	173,309,505	44,987,532	68,757,508	49,717,929
1921	201,643,228	55,383,515	76,513,279	51,375,360
1922	166,620,347	41,316,474	86,321,389	29,868,639
1923	224,375,468	53,610,175	127,417,305	28,830,817
1924	268,583,235	62,632,710	157,305,358	33,208,675
1925	274,474,538	62,563,911	167,642,790	26,378,658
1926	289,322,079	62,654,538	185,733,180	24,777,020
1927	345,685,804	74,231,840	219,778,430	22,162,718

with 1926, the totals for 1927 and 1926 being 11,660,322 cu. ft. and 12,420,977 cu. ft. respectively. The treatment of wood blocks amounted to 5,271,420 cu. ft., as compared with 3,689,424 cu. ft. in 1926, an increase of 43 per cent, but the total for 1927 amounted to only about 50 per cent of the record total of 10,145,724 cu. ft. treated in 1911. The treatment of cross arms, 1,008,192 cu. ft. in 1927, showed a decrease of approximately 20 per cent from the total for 1926. The greatest relative increase was shown in miscellaneous material, the total of 8,476,747 cu. ft. in 1927 representing an increase of 160 per cent over the 3,245,283 cu. ft. treated in 1926.

Large Increase in Creosote was of Domestic Origin

The consumption of preservatives naturally followed the increase in the amount of timber treated, and it is to be noted that that increase was almost wholly in creosote, of which 219,778,430 gal. were used, as compared with 185,733,180 gal. in 1926, an increase of 34,045,250. The amount of domestic creosote used in 1927 was 128,716,921 gal. as compared with 90,290,066 gal. in the previous year, an increase of 38,426,855, or 42.5 per cent, while the consumption of imported creosote decreased from 95,443,114 gal. in 1926 to 91,061,509 in 1927, or 4,381,605 gal. The consumption of zinc chloride showed a further decline, amounting to 22,162,718 lb. as compared with 24,777,020 lb. in 1926, and 51,375,360 lb. in the record year of 1921. Petroleum, which during the last five years has been coming into more general use as a mixture with creosote in the treatment of cross ties, showed a large increase in use in 1927, the 22,911,134 gal. used in that year representing a gain of 9,594,112 gal. or 72 per cent over the 13,317,022 gal. used in 1926. Miscellaneous preservatives were used to the extent of 631,234 gal. in 1927 as compared with 259,961 gal. in the previous year.

Crossties Treated by Kinds of Wood and Kinds of Preservatives—1927

Kinds of wood	Treated with creosote (1)	Treated with creosote-petroleum (2)	Treated with zinc-creosote (3)	Treated with zinc-chloride	Treated with miscellaneous preservatives	Total	Per cent of total
	No.	No.	No.	No.	No.	No.	
Oak	21,467,239	1,476,678	1,954,721	2,559,934	.....	27,458,572	37.0
Yellow pine	14,020,828	5,457,271	430,404	1,057,006	.....	20,965,509	28.3
Douglas fir	80,834	4,442,015	53,602	1,281,168	30,000	5,887,619	7.9
Gum	3,790,881	1,123,996	194,297	290,025	.....	5,399,199	7.3
Beech	1,494,203	320,741	244,945	748,366	.....	2,808,255	3.8
Maple	1,419,133	477,092	105,608	686,982	.....	2,688,815	3.6
Lodgepole pine	95,000	236,184	.....	2,185,909	.....	2,517,093	3.4
Birch	730,331	1,027,434	200,608	392,188	.....	2,350,561	3.2
Western yellow pine	340	653,321	431,239	367,558	.....	1,452,458	2.0
Hemlock	997	18,592	.....	722,828	.....	742,417	1.0
Tamarack	9,712	464,879	.....	211,189	.....	685,780	.9
Elm	319,442	40,610	677	119,224	.....	479,953	.6
All other	384,957	52,334	100,895	257,423	.....	795,609	1.1
Total	43,813,897	15,791,147	3,716,996	10,879,800	30,000	74,231,840	100.
Per cent of total	59.02	21.27	5.01	14.66	.04		100.

(1) Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar and water gas tar solution.
(2) Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar and water-gas tar solution in mixture with petroleum.
(3) Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar and water-gas tar solution in mixture with zinc chloride.

Cross Ties and Piles Treated

Of the 74,231,840 cross ties treated in 1927, 45,177,218 were hewed, and 29,054,622 were sawed. As usual, oak and yellow pine ties ranked first and second in point of number treated, oak ties totaling 27,458,572, or 37 per cent of the aggregate, while yellow pine ties accounted for 20,965,509, or 28.2 per cent of the total. Douglas fir ties were third with 5,887,619, or 7.9 per cent and gum ties were fourth with 5,399,199 or 7.3 per cent these four classifications comprising 80 per cent of all ties treated, of which all but 1,197,431 were for use by steam railroads.

Preservatives Used and Material Treated in the United States, 1926-1927

		1926	1927
Number of plants in active operation		180	187
Preservatives used—			
Creosote			
Domestic (1)	(Gallons)	90,290,066	128,716,921
Imported	(Gallons)	95,443,114	91,061,509
Total creosote	(Gallons)	185,733,180	219,778,430
Petroleum	(Gallons)	13,317,022	22,911,134
Paving oil	(Gallons)	2,541,563	1,389,465
Zinc chloride	(Pounds)	24,777,020	22,162,718
Misc. preservatives	(Gallons)	259,961	631,234
Material treated—			
Cross ties			
Hewed	(Number)	37,429,092	45,177,218
Sawed	(Number)	25,225,446	29,054,622
Total cross ties	(Number)	62,654,538	74,231,840
Piles	(Lin. ft.)	18,366,075	17,241,345
Poles	(Number)	2,813,130	3,637,989
Wood blocks	(Sq. yds.)	1,405,495	2,008,160
Construction timbers	(Bd. ft.)	373,767,441	390,539,947
Cross arms	(Number)	2,169,097	1,626,641
Miscellaneous	(Bd. ft.)	38,943,397	101,720,964

(1) Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar and water-gas tar solution.

The lineal feet of piles treated in 1927 totaled 17,241,345, a decrease of 1,124,730 lin. ft. from the total for 1926. Of the 1927 output southern pine ranked first with 13,359,652 lin. ft., or 77 per cent, Douglas fir was second with 2,901,982 lin. ft. or 17 per cent, oak was third with 493,788 lin. ft., or 2.9 per cent, while cypress cedar, tamarack and lodgepole pine came next in the order named.

A total of 3,637,989 poles were treated in 1927, an increase of 824,859 over the 2,813,130 that were treated in the previous year. Southern pine poles, with a total of 1,738,839, were first in point of number treated, accounting for nearly half of the total. Western red cedar poles were second, with a total of 1,112,500, while northern white cedar, with 431,744, and chestnut, with 324,248, were in third and fourth rank, respectively.

Of the poles treated, 1,749,682, or slightly less than half, were pressure treated, while 1,888,307 were butt treated only. All but 10,843 of the pressure-treated poles were of Southern yellow pine, while of those given butt treatment, western red cedar stood first with 1,112,500, Northern white cedar was second with 431,744, and chestnut was third with 324,248.

In construction timbers, the most important items, from the standpoint of railroad use are switch ties and bridge timbers, 182,411,211 ft. b.m. of switch ties having been treated in 1927 as compared with 158,128,637 ft. b.m. in 1926. The amounts of bridge timbers, lumber, fence posts, tie plugs, crossing plank, switch ties and car materials treated in 1926 and 1927 are shown in the appended table.

	1926 ft. b.m.	1927 ft. b.m.
Lumber	12,255,609	53,567,458
Fence posts	6,742,132	23,439,193
Tie plugs	2,664,459	2,045,765
Car material	2,954,088	1,778,928
Crossing plank	286,008	419,541
Switch ties	158,128,637	182,411,211
Bridge timbers		128,290,660

The growth of the wood preservation industry is further indicated by the fact that the 187 plants in operation in 1927 represented an increase of 7 over the number in operation in 1926. Of these 187 plants, 117 were pressure-cylinder plants, 56 were non-pressure (open tank) plants and 14 were plants operating both pressure and non-pressure equipment. Only 33 of the plants were owned and operated by railroads.

The Pennsylvania's Expense Budget

A system of thoroughgoing control of performances adapted to meet railroad conditions

By A. J. County

Vice-President, Accounting Department, Pennsylvania Railroad

I WANT to redeem a promise made more than five years ago to the *Railway Age*, by contributing an article on the use of the budget on the Pennsylvania Railroad System. Its definite object is to control expenses, to emphasize the need for larger revenues and bring home to every officer the responsibility of earning a proper share of net income. Budgets are of little use unless intelligently made and enforced under competent supervision. I think our whole organization has become so accustomed to the use of the budget, and the results have been so striking, that we may endorse its use.

Recently, our comptroller, F. J. Fell, Jr., testified before the Interstate Commerce Commission on this important subject, and this review is based chiefly on his splendid presentation and my own supervision of the results of budget workings.

Situation at Close of War

The Pennsylvania, of course, has at all times had various methods for controlling expenses and increasing revenues, but the regular flow of traffic and the maintenance of the property had been so disrupted by the war, and the situation rendered more acute by the business depression of 1921 and the internal and external labor difficulties of 1922, that new methods were essential. During and after the war, so many changes had occurred on the railroad and in headquarters and line officers and supervisors, that with the far-reaching changes in plant locations and production methods and in the conduct of general business and industry, responsibility for adequate railroad revenues, reasonable expenses and capital outlays was most pressing. This responsibility could not rest solely in the hands of the supervisory and directing officers at the company's headquarters. It had to be transmitted down the line and even went so far that a new system of employee representation and co-operation had to be evolved. With an operating ratio which consumed practically all of the revenues, a transportation evolution of the first magnitude had to be created and enforced.

To meet these conditions the adoption of the budget —practically a daily check on the traffic handled, and on labor and material expenses—was a necessity of the situation. Budgetry control had to be assumed before outlays were made, and thereafter explanations were not a valid answer for failure to earn net revenues.

Budget Practice Must Be Elastic

We have gone far enough in the situation to realize that no one company may claim to be more successful in dealing with railroad revenues and outlays than another, because even on one railroad the diversities of the situation are so great that considerable latitude must be allowed to develop proper supervision of such outlays. These, from time to time, must be revised by the men in direct charge of the various parts of the railroad as well as by the supervising officers, or the full economies will not be realized. Get every department interested in framing the budget and checking up its results. Any prescription of hard and fast methods that does not take into account the various business and industrial changes that are going on throughout the country will defeat its own purpose. Total railroad traffic is more stable than in former decades and passenger traffic continues to decline. Improved highways and motor service, and the use of private motor cars and trucks for long and short distances, exercise a potent influence on railroad conditions. Capital outlays, larger and more economical locomotives, longer runs for locomotives, improved shops and more efficient machinery, yards, improved fuel performance, an intense desire to serve the industries and the public better, all have been and are influencing factors. Initiative must be given wider scope, the total results must be satisfactory to the company's supervisory officers and owners, each section of the railroad is obliged to show improved results, which, in most cases, flow from greater efficiency, the elimination of plant, yard, stations, or expenses not needed for the proper conduct of the service and condition.

Railroad Conditions to be Met

Management and employees have practically eliminated public complaints; congestion is unknown, bottlenecks are smooth running train rivulets and railroad credit has been improved. A broader conception of the usefulness of railroads has been clearly evidenced by the more helpful attitude of railroad legislation and regulation. This is most essential, as railroad rates have been

Mr. County Says

"Any prescription of hard and fast methods that does not take into account the various business and industrial changes that are going on throughout the country will defeat its own purpose . . . .

". . . . the country must have mass transportation movement at lower costs on railways, highways, airways, maybe waterways and the open sea; and what agency can do it better than the organized railroads, if not prevented by limited credit and too much regulation and legislation?

"We have tried to give an outline of the methods pursued in setting up our budget, so as to indicate that we have an effective control on our expenses. The methods pursued for a railroad must necessarily be different from the system in force in industrial plants."

moving steadily downward since 1920, and traffic has not shown the same growth as in previous decades. These must be offset by operating economies. Taxes and other public outlays have materially expanded. All of this demands better operating results and lower expenditures from all Departments, wiser use of capital expenditures for better plant and working tools and facilities; gasoline-electric motor cars to replace trains and the heartiest co-operation by managements and employees to draw more forward looking plans for electrification, motor trucks and buses; even air service—in short, the country must have mass transportation movement at lower costs on railways, highways, airways, maybe waterways and the open sea; and what agency can do it better than the organized railroads, if not prevented by limited credit and too much regulation and legislation? The expense budget and the capital budget, therefore, have a most useful place in this program and there should be a free field for the creative genius that must be brought into play to give the country ample transportation, and revive railroad credit.

Expense Budget on the Pennsylvania

This article deals chiefly with the expense budget, which must furnish real nourishment for the financial stability of the company.

The management of the Pennsylvania Railroad recognizes the extreme importance of a proper system of budgeting and accounting, and that costs must be the lowest consistent with safety.

The Pennsylvania System does almost 12 per cent of the railroad business of the country (Operating Revenues—Class I Roads). It transports a little over 11 per cent of the total ton-miles and about 18½ per cent of the passenger-miles. These figures are given to show the relative importance of a proper system of budgeting and accounting to the Pennsylvania.

The budget and methods of controlling costs to which I refer are for the Pennsylvania Railroad Regional System, which is 94 per cent of the entire Pennsylvania System, the main company of the system excluded being the Long Island Railroad, which carrier also has a budget.

Budget Is a Definite Goal

The Regional System is selected to simplify the presentation and the definite results. The "budget" is nothing more or less than an advance systematic allotment of expenditures by departments, based upon experience and regulated by the volume of work to be done, or the estimated traffic to be handled, with the responsibility for the expenditure placed on the various divisional or department heads to get net results.

It is a definite advance goal to strive for, and all forces must be co-ordinated and directed toward the attainment of a definite objective. It must keep transportation production and satisfactory service not only within the limits of revenues, but fixed charges must be earned and dividends paid.

Budget Factors

The Pennsylvania divides its operations into four main groups, the Eastern Region, which comprises all of the lines east of Altoona; the Central Region, which covers the territory from Altoona to Mansfield, and to Columbus; the Western Region, which covers the territory west of Mansfield and Columbus, to Chicago and St. Louis; and the Altoona Works.

Three introductory factors enter into the operation of a budget:

A. The expenditures to be budgeted.

B. The preparation of forecast requirements.

C. Definite periodical control of expenditures during month budgeted.

A. Expenses To Be Budgeted

Five elements of expenditure are herewith cited:

1. Labor—which is controllable by alloted force and workday schedules, program of work and traffic estimates, and consumes close to 50 per cent of all of the revenues.
2. Materials—which can be estimated reasonably in proportion to the labor expended on the basis of past performance.
3. Fuel—which is predetermined on a factor basis covering the mileage of the various types of locomotives in service.
4. Miscellaneous bills—including joint facility and equipment rents, telephone, water, current and other variable items, which must be estimated on basis of past performance.
5. Depreciation, etc., which are fixed items.

The above constitute the major cost elements which predicate budget forecasts, and necessarily operating expenses.

B. The Preparation of Forecast Requirements

Budget forecasts necessarily must be built up from the point where the expenditure originates and the responsibility begins, and the basis of such forecasts must be a personal knowledge of physical facts upon the part of the track foreman, supervisor, shop or enginehouse foreman and other supervisory heads of the department involved. These facts, supplemented by a further knowledge of past performance costs of the above mentioned sources of expenditure, and of estimated production results, underlie the preparation of all budget forecasts.

However, before becoming effective, such forecasts must be and are reviewed and approved, through regular channels, by the divisional, general divisional and regional officers, and finally approved by the vice-president in charge of operation, who also hands down final allotments to his subordinate officers for their guidance and regulatory control. These budgets also come to the executive officers and board of directors. These final allotments are likewise built up on the estimated business and a knowledge of physical facts (revised often from the original figures), and are subject to sliding scale changes dependent on the fluctuations of the actual traffic, which is compiled periodically and furnished all interested parties. The responsibility for the expenditure is always upon the department or division incurring the expense. To make this point clear, the general procedure is as follows:

The operating division is responsible for all expenses it directly incurs in its divisional operation, for the expenses of any and all shops located on its division, each shop having its own particular budget, such budget being alloted on the basis of the kind of shop, and the kind and class and number of repairs to be made in the particular month.

The general division office is responsible for all expenses it directly incurs in its operation, being principally the administration expense of its general division offices.

The regional offices are responsible for all expenses they directly incur in their operation, being principally the administration expenses of the regional offices.

The system expenses include the salaries and other direct expenses incurred in the offices of the president and vice-presidents and departments coming directly under their jurisdiction; such as traffic department, accounting department, real estate department, purchasing department, etc. Fixed charges and other outlays and the income from investments find their appropriate place in each month's requirements.

The net result is, of course, to place the responsibility for expenditure right down to the supervisor doing the

work,—the track foreman, the master mechanic, the train master, or other heads of departments. Some supervisor is responsible for every dollar of expenditure.

C. Definite Periodical Control of Expenses During the Month Budgeted

Having shown above in a general way the source, elements of expenses and the method of forecasting, approving and alloting of monthly budgetary programmes, the next important feature is the control of expenditures.

The division superintendent, master mechanic, etc., after the receipt of the approved divisional allotment, sub-divides it as follows:

Divisional to Departmental (M. W. S.—M. E.—T. E.)

Departmental to Sub-Departmental

thereby pinning down, as stated previously, the expenditures to the original source of both expense and responsibility.

Two methods are used in reporting periodical expenditures to the affected Divisional officials.

1. By *daily* reports, showing the *daily* status of the expenditure as compared with related allotments. These statements show actual labor costs, with estimates of all other source items, and are forwarded to divisional, general divisional, regional and system officials (through regular channels) from 3 to 4 working days after the actual work performance.

2. By periodical reports, showing actual labor and material charges (as abstracted from daily time cards and material orders) with estimates for other items of expense. These statements are furnished as follows: The first report covering 10 days; subsequent reports at 5 day periods. Any necessary adjustments of the daily figures are made in the period reports. These statements are also forwarded to interested officers as cited above.

By this procedure all responsible officers are kept in close touch with the accumulative and comparative status of both expenditure and allotments and have basic and reliable information from which to issue such regulatory control instructions as are deemed warrantable.

At the close of each month, the actual expenditure by department accounts and by original source items are furnished, together with explanations from the responsible parties, of all pronounced over-runs. Over-runs not caused by increased traffic or extraordinary emergencies will not be tolerated. Efficient control of expenditure, as indicated above, cannot reduce necessary expenditure, as original sources of expense are predicated on established costs for labor and material. But it can and it does promote conservation, it eliminates wasted effort, it originates modern and more efficient and economic methods of work and it reduces overtime to the lowest possible minimum. It demands comparisons with what our competitors can do.

General Budget Considerations

To carry the explanation, as to control of the budget, down to its minute details, would require a great deal of time and extend this article. Suffice it to say that all departments, down to the foreman, are held to their allotments through a detailed check.

We have tried to give an outline of the methods pursued in setting up our budget so as to indicate that we have an effective control of our expenses. The methods pursued for a railroad must necessarily be different from the system in force in industrial plants.

We manufacture transportation—ton-miles, car-miles, etc.—and cannot definitely fix what we will turn out in a day, a week or month, but must produce our commodity as, where, and when needed, and we cannot stabilize our traffic as is done in industrial lines where a certain number of units is agreed upon as a month's production and arrangements made accordingly. Our passenger trains must be run on schedule irrespective of weather and other conditions or whether we have 50 or 200 passengers, and passenger runs, *maintained at pronounced loss,* cannot be discontinued without permission from commissions.

A budget necessarily is, if properly handled and applied, a brake upon expenditures.

Every track foreman or supervisor is on a competitive working basis with other sections; master mechanic's unit production costs are matched up against similar performances on other divisions, and the burden of explanation for the greater cost falls on the supervisory head responsible. Today a man's job depends upon the efficiency displayed.

Such competition, of both supervision and work cannot fail in its tendency to produce maximum production for every dollar spent, and makes the responsible supervisor devise new and more economical methods. However, there is something more required than the budget, and the natural question which comes to one at this time, is—how do we know that the unit or other costs are economical costs, all factors considered? Arbitrary reductions are made where we believe that unit or other costs are too high—such reductions being simply an accumulation of experience, and the measurement of one against the other and forcing, as previously stated, new and better methods by the dollar limitation, and closer supervision of the work.

Again we have what is termed the survey method. This is particularly adapted to station, yard and office operation. A committee of experts will look over conditions on the ground, study the moves, look over the personnel and fix what in their opinion is a necessary complement for the particular yard, station, etc. Intensive studies of yard operations have reduced expenses, such as the extension of prior classifications of cars, eliminating intermediate switching and cutting down terminal delays with consequent reduction in overtime. These committees are continually at work. The work goes on all the time—we are never satisfied that we have made all the economies that it is possible to make. The large reduction in repairs to locomotives and cars have been due to a considerable extent to the adoption of a plan for consolidation of shops.

The concentration of repair facilities at one point permits a reduction in the overhead, supervision, reduction in amount of stock and reduced cost per unit of equipment repaired. For example: We built two large steel freight car shops at Pitcairn and Enola, with a capacity of 33 steel open top cars per day each. These shops are so laid out that the work of repairs progresses in stages, viz., cutting down, dismantling, assembling and painting. These shops are equipped with overhead cranes, hydraulic gap riveters and assembly benches; thus reducing to a minimum the manual labor required. The transporting of material is performed by cranes, while the riveting work is done with machine riveters; thus greatly decreasing the cost per unit as compared with the previous method of doing the work in open yard repair tracks.

Box car work is also concentrated at three principal shops, taking the cars through such shops by classes of construction. Locomotive and passenger car class repairs were similarly concentrated at fewer points and the economies realized therefrom.

To indicate what has been done in connection with the consolidation of shop repair points, I give below the figures for 1927 and 1921:

	1927	1921	Decrease
Shops giving class repairs to passenger cars.....	7	14	50.0%
Shops giving class repairs to locomotives.....	9	43	79.1%
Enginehouses giving light repairs to locomotives..	94	121	22.3%
Heavy repair points, Class 1 and 2 repairs.....	16	85	81.2%
Light repair points, Class 3 and 4 repairs.....	84	158	46.8%

In addition we have a series of reports, some on the dollar basis, and some on a statistical basis, which after all becomes the dollar basis. Some are current reports and some are monthly reports. If the budget amounts

are exceeded, the first question is as to the volume of traffic in units of gross ton-miles, car-miles, engine-miles, etc. If the increase comports with the traffic, then we have the answer; if not, further analysis is necessary to determine its cause, and if it is a matter that requires correction then the necessary steps are taken.

System Results

To indicate what has been accomplished on the Pennsylvania, I give below a few facts:

Operating Ratio

In 1920—an unusual year—operating expenses and taxes consumed all of the revenues; in 1921 the operating ratio was 87.83 per cent, while in 1927 it was 77.02 per cent. For the seventh successive year a decrease in operating ratio has been obtained.

Number of Employees:

In 1920, 270,168; in 1921, 202,885; in 1927, 190,533; and 1928 will show a further decline.

Freight Transportation Expenses per Freight train mile:

1921, $3.99; 1927, $3.36, a reduction of 63 cents per train mile, which does not tell the whole story as the train mile of 1921 carried only 841 net tons, whereas the train mile of 1927 carried 930, an increase in trainload of more than 10 per cent.

Transportation Expenses per Freight Car Mile (loaded and empty)

1921, 9.72 cents; 1927, 6.80 cents, decrease of 30 per cent.

Transportation Expenses per Passenger Train Car Mile:

1921, 19.04 cents; 1927, 15.42 cents, a reduction of 18 per cent.

Locomotive Repairs per Locomotive Mile:

1921, 41.94 cents; 1927, 29.52 cents.

Freight Car Repairs—per Car-Mile—(loaded and empty)

1921, 2.61 cents; 1927, 1.48 cents.

Passenger Train Car Repairs per Car-Mile

1921, 2.69 cents; 1927, 2.20 cents.

Operating Revenues & Expenses

A comparison of 1927 with previous years is another check upon what has been accomplished. In 1927 we had 47 million more earnings than in 1921 and 32 million less expenses. In 1922 we had 16 million less earnings and 25 million more expenses. In 1923 we had 60 million more earnings and 83 million more expenses, and so on.

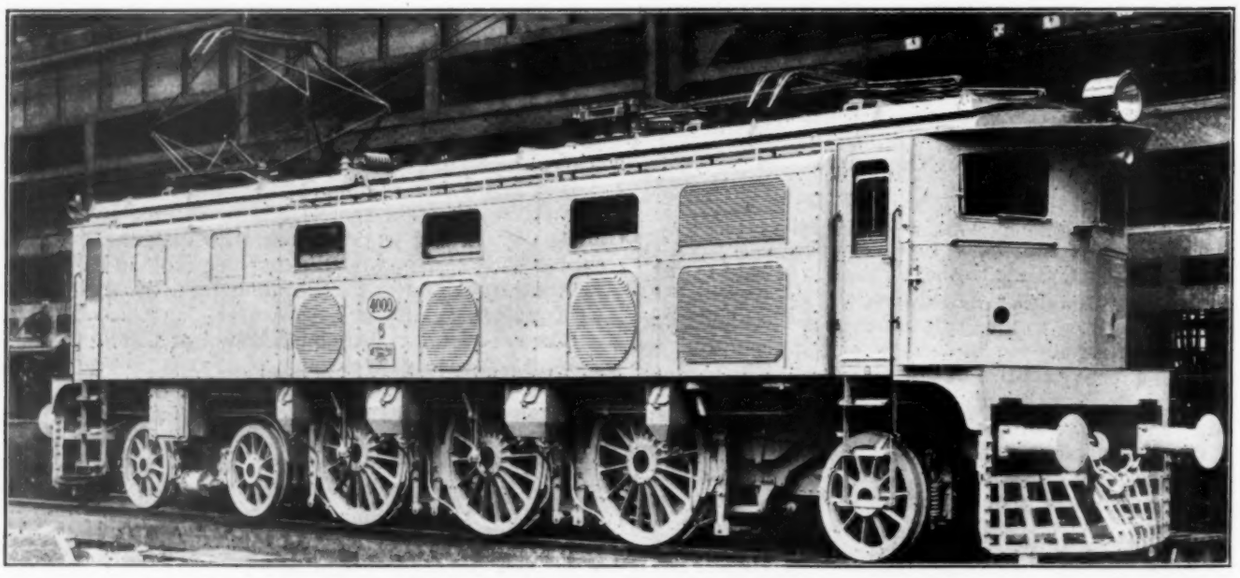
Gross tons per train in 1921 were 1697 while in 1927 they were 2012. Gross ton-miles per train-hour rose from 17822 to 22532 between 1921 and 1927, etc.

I have gone into the Pennsylvania budget system and some of the methods in force for analyzing and decreasing costs for the purpose of indicating that the railroads today have their own methods of reaching the result desired by all, i. e., an economical and an efficient operation, and to show that the effort goes on continuously, and it is revised continuously.

I have not attempted to make this article all-inclusive, but have tried to give a sufficient number of illustrations to make clear that the railroads have their own effective methods for reducing costs.

I avoid the temptation of urging the adoption of our budget plan by other railroads, although it has worked well with us. I earnestly add a caution that a budget plan be not sterilized by orders of absolute uniformity that would rob active officers and employees of the free field of personal initiative to use any method, and vary all methods, so as to obtain better net results. Don't attempt to convert supervisory officers into statistical sharks or office men, in place of having them exert their personality and experience in the working life of every part of the railroad to improve methods, and close up non-productive facilities and efforts. Half of the battle for net income is eternal vigilance, based on experience and a cheerful appetite for better productive efforts and net results.

* * * *



An Experimental Passenger Locomotive Built by the Metropolitan-Vickers Electrical Company, Ltd., Manchester, England, for Service on the Great Indian Peninsula Railway

This type of locomotive which will operate from a 1500-volt overhead will develop 2160 hp. and is capable of speeds up to 85 miles an hour. The motors and gearing are rigidly mounted on the frame of the locomotive and transmit power to the driving axles through a universal motion flexible link drive. The weight of the locomotive is about 100-tons of which 60-tons is adhesive weight. The mechanical parts of the locomotive were supplied by the Swiss Locomotive Works of Winterthur, Switzerland.

Illinois Chamber of Commerce Told Railway Needs

Transportation Committee of important state organization urges business interests to favor constructive regulation

THE Transportation Committee of the Illinois Chamber of Commerce, of which Walter S. Carr is chairman, recently has made an interesting and significant report regarding the railway situation to the board of directors of that organization.

The Illinois Chamber of Commerce is representative of all the business interests of the state. Its Transportation committee has 24 members, of whom only four are railway officials, and therefore, as it says in its report, "the shipper and the public have the preponderance of representation upon this committee. Its conclusions are determined," the committee adds, "only after careful study and are rendered from an economic and a business standpoint. The business of railroad transportation in all its ramifications constitutes one of the greatest business activities of the United States. The principles and policies involved in determining the character of 'reasonable regulation' by the government of this great industry have an important economic bearing on every other business conducted in our country."

Importance of Good Transportation Emphasized

The committee emphasizes the importance of good and adequate transportation to the business interests of Illinois, and discusses the railroad situation in part as follows:

"As a distributing area and a marketing center Illinois has no peer, with its ability to reach in excess of fifty millions of people overnight. It is the second state of the Union in the amount of rail trackage, but has more miles of trackage per square mile than any other state in the Union. Its rail transportation system has had a most important bearing in the building and development of the central west.

"Insomuch as our railroads are subjected to so-called 'reasonable regulation' by the government of the United States through Congress and the Interstate Commerce Commission, in addition to the enactments of the state legislature and rulings of our state railroad commissions under various names, your committee must include in its activities such national legislation as pertains to rail transportation.

Railway Legislation in Congress

"In addition to the large number of bills which died in the sixty-ninth Congress whose subject matter was revived in the seventieth Congress, there were many national issues before the Congress demanding attention. While the usual number of bills affecting railway legislation were introduced, the first session of the seventieth congress failed to enact a single direct piece of railroad legislation into law. We wish to emphasize the fact, however, that it is just as important to prevent the passage of inimical legislation as it is to enact beneficial laws. Furthermore, certain trends and tendencies are evolved from the sessions of the national Congress which are indices of where we are drifting in regard to the treatment of regulation of the railroads.

"This subject was again before the Congress in the form of the Parker bill, which was reported to the house but which made no further progress. Your committee has twice before indicated its position retarding railway consolidation, namely: It is the sense of the Transportation Committee of the Illinois Chamber of Commerce that we are opposed to the principle of compulsory consolidation. Your committee is not opposed, however, to consolidation along voluntary lines based on economic needs. It has been our belief, and continues to be, that whatever legislation is enacted by Congress dealing with this subject should be for the purpose of removing restrictions which may exist or such voluntary consolidations as may be deemed in the public interest by the Interstate Commerce Commission.

Consolidation Involves Economic Questions

"It is beginning to be realized that this whole question of consolidation involves a number of very important economic questions, and that the need exists for a better set-up of facts than has appeared heretofore. There is some sentiment within the Interstate Commerce Commission that they themselves should develop a 'model plan' for railroad consolidation, as it is required to do under existing law. At this writing it is by no means assured that we shall see a consolidation bill passed at the short session of the seventieth Congress, which will convene in December of 1928 and which automatically expires on March 4, 1929. Sooner or later, however, the study and investigation of this subject may result in the formation of a plan which is economically sound and which will be in the public interest.

The Pullman Surcharge

"A bill to abolish the surcharge on sleeping and parlor car tickets, authorized by the Interstate Commerce Commission, has been before the Congress for the past few sessions. At each session this bill is persistently introduced and twice the bill has been passed by one house of Congress to abolish the surcharge. The passage of such a bill would result in a loss to the railroads in passenger revenues of approximately forty millions of dollars, which loss in revenue from sheer necessity would have to be made up elsewhere, a task both complicated and difficult.

"Your committee has on principle always persistently opposed any and all regulation which involves direct legislative rate making, and that is what a bill to abolish the Pullman surcharge on the part of Congress really means.

"Among the bills revived which have been under serious consideration by previous sessions of the Congress is the Gooding bill, commonly known as the Long and Short Haul Bill. Your committee has continually

opposed the removal of jurisdiction of the Interstate Commerce Commission to determine at its discretion whether the provisions of the long and short haul section of the Transportation Act, otherwise rigid, should under proper circumstances be suspended for the relief of shippers.

"In regard to the regional appointment of Interstate Commerce Commissioners, proposing to enlarge the membership of the commission to 13 members and providing for the regional appointment of the members thereof, your committee opposed the passage of this bill at previous sessions of Congress, and reiterates its position in regard thereto, namely—that regional appointment would have a tendency to promote sectionalism in the treatment of matters before the commission and that it is wise in the circumstances to maintain the quasi-judicial character of the commission and that the best talent available for it be appointed regardless of geographical limitations.

"With reference to provisions for regional sub-commissions, providing in addition to the Interstate Commerce Commissions several district commissions that would have power to order cases within their own districts, the sentiment of the committee was and continues to be that there is no evidence to show that the appointment of regional sub-commissions would materially better present conditions, that the committee opposes on principle types of legislation which complicate rather than simplify administration.

Continued Agitation for the Repeal of Section 15A

"Section 15A of the Transportation Act is in effect a legislative declaration of the policy of regulation based upon the principle that as the profits of railways are to be limited they should be assured of an opportunity to earn a fair return on the fair valuation of their property. In spite of this fact, however, a number of bills have been introduced, and probably agitation will continue for the repeal of this section, which, if accomplished, would in effect be a declaration to the Interstate Commerce Commission that there is no limitation upon the extent to which it may reduce the return earned by the railroads as a whole, except such restraint as would be exercised by the federal courts in confiscation cases. This subject is mentioned here because of the probabilities that it will continue to be presented for congressional action. Your committee, while it has given action thereon because its general policy has been to take definite action for or against definite bills introduced into Congress rather than make a declaration as to general policy.

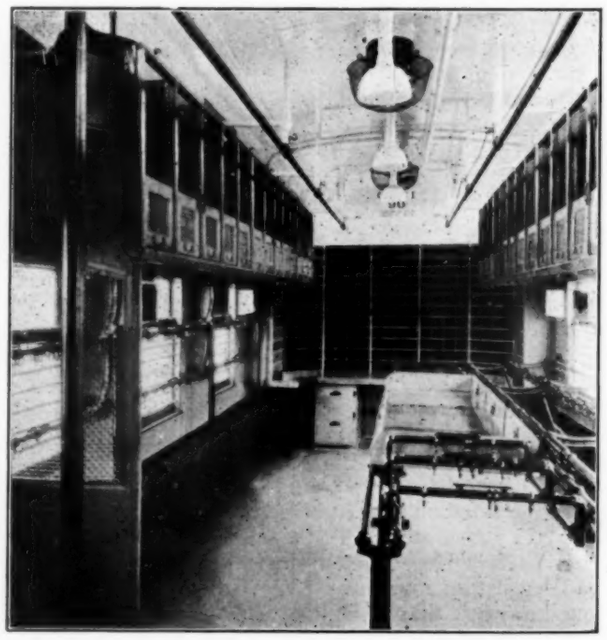
"In any attempt to look into the future it is necessary to have in mind the results of our policy of regulation for the past decade. There can be no question but that the railway owners and managers have performed their duty well and efficiently, with the result that railway service is today of a high order and the commerce of the country has been adequately served. The railways have invested large amounts in the expansion and improvement of their properties. It is a fact that many of their stocks are selling at higher prices than ever before, probably due, however, to the expectation on the part of investors and railway management that the public, the Interstate Commerce Commission and the Congress will adhere closely to the policy of regulation announced. While it is a fact that our declared policy of regulation holds that the railways shall be allowed to earn on the average of a fair return, they have not been permitted to do it. On the other hand, there has been constant pressure for reduction of rates and an added tendency on the part of the Congress, for political purposes, to intervene by resolution and otherwise to hamper directly or indirectly the commission in the application of its own standards in the fixing of rates.

"With the average percentage of return earned by the railroads as a whole on their property investment less in 1927 than in any year since 1922, and with fixed overhead gradually but persistently mounting, sooner or later railway service to commerce will cease to be adequate and satisfactory unless certain prevailing tendencies in our regulation of the railways is changed. While both rates and wages were reduced in 1922, since 1923 freight rates have been reduced to the extent of $150,000,000 annually. Wages have likewise advanced $170,000,000 and taxes have increased approximately $44,000,000 annually, to say nothing about loss of passenger business.

"It is almost axiomatic that capital will not flow to industries which can not pay an adequate return for its use. The railroads in order to continue to furnish high class service essential to take care of commercial progress must, like any other sound business, operate under conditions which permit of their earning a fair return. It is becoming apparent that our system of regulation is sufficiently restrictive, that in fact the application of our announced policy of regulation has been additionally restrictive.

"It is our belief that it is more important today than ever before that the public be informed relative to the facts concerning rail transportation and its regulation. The declared policy of regulation by the government is sufficiently drastic in itself and any attempt upon the part of Congress to regulate rates by direct legislation or to interfere for any political reasons with the functioning of the Interstate Commerce Commission in the interpretation of the present Transportation Act, can only result in crippling the service of railroad transportation to an extent which would be harmful to the interests of business."

* * *



Modern-Equipped Mail Compartment in New All-Steel Mail-Smoking Cars Recently Built for the C. & E. I. by the Pullman Car & Mfg. Corp.

Ljungstrom Turbine Locomotive Leaving Hagalund, Sweden, for Road Test, November, 1921

Ljungstrom Turbine Locomotives

Total of four now in freight and passenger service in Sweden, England and Argentine—Tests show low coal and water consumption

ELEVEN years ago, the brothers, Frederick and Birger Ljungstrom, started work on the development of a complete design of turbine locomotive, which finally resulted in the building of what has been known for a number of years as the first Swedish Ljungstrom turbine locomotive. This locomotive, descriptions of which have been published in these columns, was constructed by Aktiebolaget Ljungstroms Angturbin, Stockholm, Sweden, in 1921. It was built primarily for experimental purposes and has been put through a large number of road and plant tests since its construction.

The latest developments of the Ljungstrom turbine locomotive are the 2,000-hp. express turbine locomotive built by Messrs. Beyer, Peacock & Co., Ltd., Manchester, England, which has been running in regular service on the Midland Division of the London, Midland & Scottish Railway since July, 1927, a 1,750-hp. freight locomotive built by Nydquist & Holm, Trollhattan, Sweden, for the Argentine State Railways, and an 1,800-hp. express locomotive for the Swedish State Railways, which was also built by the latter company. The design and construction of the English locomotive is similar in many respects to that of the Argentine locomotive, except that the former is standard gage and burns coal, while the latter is meter gage (3 ft. 3½ in.) and uses oil for fuel. The results of the experiences with the first locomotive were embodied in all three of the new designs, and as a result they differ considerably in details and appearance.

The Ljungstrom Locomotive Built for the Argentine State Railways

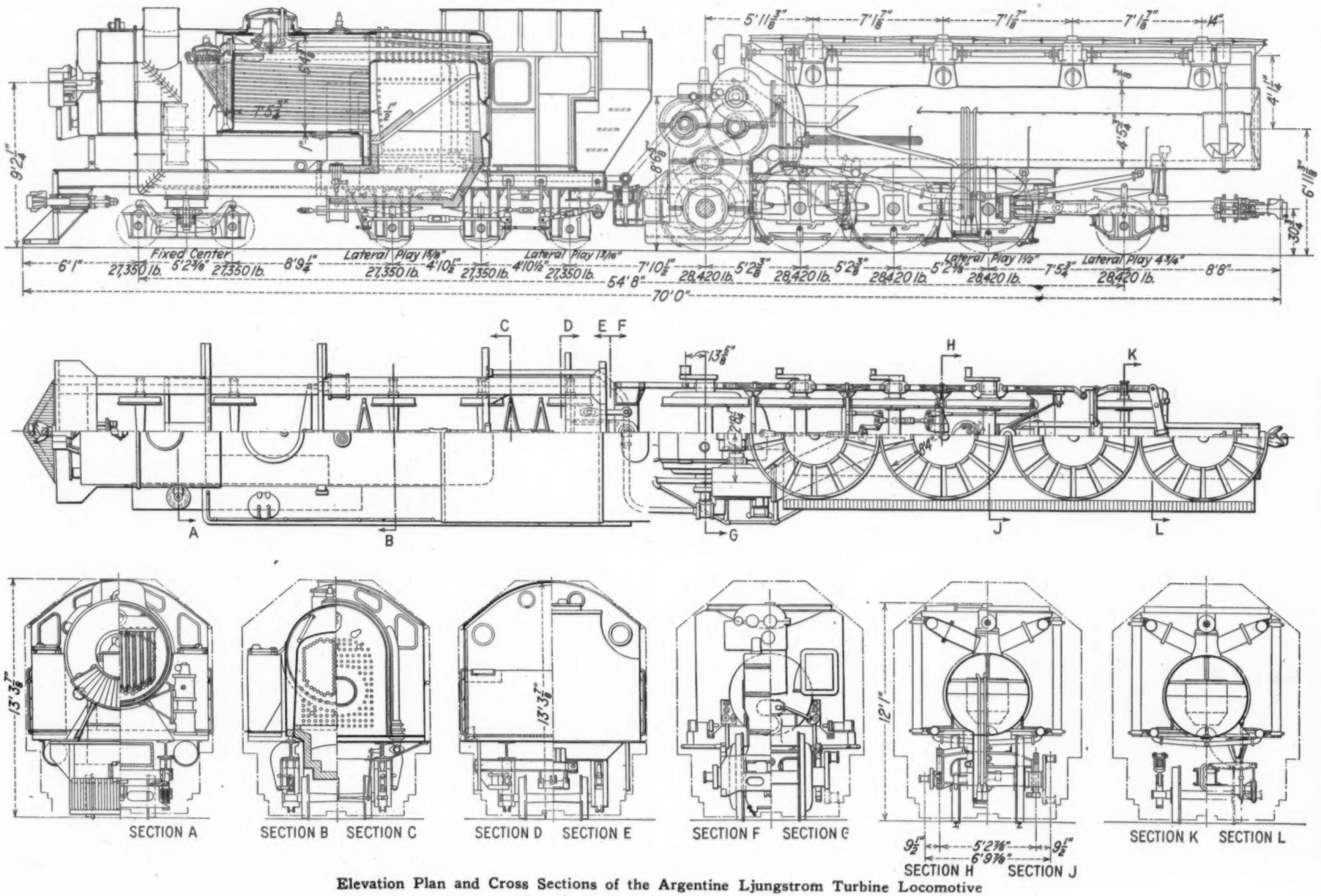
One of the drawings shows the elevation, plan and a number of cross sections of the Ljungstrom turbine locomotive, which was delivered to the Argentine State Railways for trial in freight service in 1925. Previous to shipment, however, this locomotive was tested on a specially built testing plant, located at the works of Nydquist & Holm. This plant was built only for testing the mechanical features of the locomotive, and for establishing the capacity of the boiler and condenser. The boiler was fired with an oil-firing apparatus of Ljungstrom design, and the first tests were made to ascertain its reliability. The builders succeeded in obtaining satisfactory combustion, and a boiler efficiency of 87 per cent in these tests. The test on the condenser was also satisfactory.

These tests, however, were discontinued on September 24, 1925, the time for delivery being overdue, and the locomotive was shipped on October 14, 1925, to Buenos Aires, where it was reassembled in the locomotive shops of the Argentine State Railways at Tafi Viejo. The work of assembly was completed in February, 1926, at which time road tests were inaugurated. No road tests were made in Sweden because of the lack of meter-gage track.

Road Tests in Argentine

A number of preliminary trips of short duration were made in February and March, 1926, for the purpose of adjusting the mechanical details and also to adjust the oil burners to the quality of fuel oil used by the Argentine State Railways. The fuel oil used in that country is considerably heavier than that used in Europe. However, only a few alterations to the oil burner apparatus was necessary for it to handle the heavier oil satisfactorily.

On March 13, 1926, the first test was made over the Tucuman and Santa Fe line, over which the locomotive was to be used in regular freight service. This line has a gradual slope from Santa Fe to Huyamampa, which is about 415 miles from Santa Fe. From Huyamampa to Tucuman, a distance of a little over 82 miles, the line passes through the first approaches of the Andes Mountains and Tucuman is about 740 ft. above Huyamampa. The builders guaranteed an oil consumption of 50 per cent of that consumed by the piston type locomotives purchased in 1924. This fuel



Elevation Plan and Cross Sections of the Argentine Ljungstrom Turbine Locomotive

saving, however, was only guaranteed during the cold season of the year. During the hot season, when the transfer of heat through the surfaces of the air-cooled condenser is reduced, the guarantee was reduced to 40 per cent. The water consumption was guaranteed to be 52.8 gal. per hour.

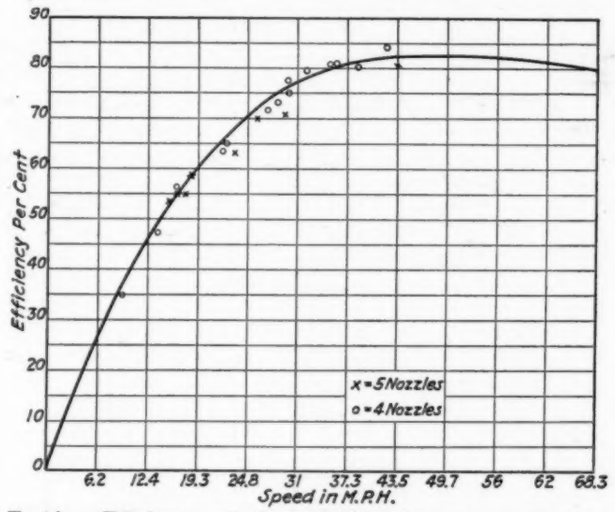
This fuel and water consumption of the turbine locomotive had to be calculated from the results taken from four official tests, one made during each season of the year. Of the 500 miles lying between Santa Fe and Tucuman, approximately 250 miles is through desert country in which the water supply and facilities are not adequate for locomotive purposes. As a result, piston locomotives are required to haul about 24,000 gal. of water in the train, not including the supply on the tender. In addition, the water supply outside of this desert area was such as to cause rapid corrosion in the boilers, which in several instances, resulted in serious explosions.

The results of the four test runs, especially from the standpoint of water consumption, showed that the turbine locomotive was well fitted for service in desert country and in territories where the water supply was bad for steam generation. The total water consumption of the turbine locomotive was sufficiently small so that all the water required for leakage losses could readily be evaporated before being delivered to the locomotive. No deposit was found in the boiler at the end of the trial year. However, silt and other impurities in the water had, in some instances, caused trouble, especially in the tubes of the superheater. This difficulty was eventually corrected, as the superheater tubes had been constructed with too small a diameter, and had a tendency to become plugged.

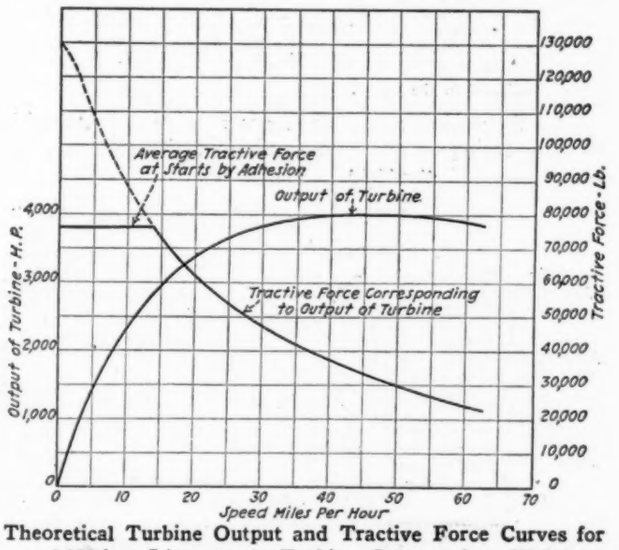
From the standpoint of performance, the tests showed that the turbine locomotive could start and haul heavy trains with comparative ease. This feature is particularly advantageous in Argentine, owing to the fact that heavy freight traffic is of a periodical nature. In certain seasons of the year, the sugar business is heavy, which, in addition to the regular freight traffic, throws a considerably increased burden on the railroad. During the past year, the turbine locomotive has been of considerable assistance in relieving congestion at intermediate terminals.

Comparative Table of Dimensions, Weights and Proportions of the Three Latest Ljungstrom Turbine Locomotives

Railroad	Swedish State	Argentine State	London, Midland & Scottish
Builder	Nydquist & Holm	Nydquist & Holm	Beyer, Peacock & Co., Ltd.
Service	Express	Freight	Express
Track gage	4 ft. 8½ in.	3 ft. 3½ in.	4 ft. 8½ in.
Weights in working order:			
On drivers	110,000 lb.	113,680 lb.	108,000 lb.
On front truck	56,400 lb.	54,700 lb.	52,200 lb.
On intermediate truck	105,000 lb.	72,050 lb.	87,200 lb.
On rear truck	44,000 lb.	28,420 lb.	38,600 lb.
Total engine	315,400 lb.	268,850 lb.	286,000 lb.
Wheel bases:			
Driving	50 ft. 8¼ in.	54 ft. 8 in.	63 ft.
Total engine	74 ft. 9⅝ in.	70 ft.	73 ft. 11 in.
Wheels, diameter outside tires:			
Driving	60 in.	58 in.	63 in.
Front truck	———	———	39 in.
Intermediate truck	———	———	39 in.
Rear truck	———	———	39 in.
Boiler:			
Type	Straight top	Straight top	Belpaire
Steam pressure	280 lb.	280 lb.	300 lb.
Fuel, kind	Coal	Oil	Coal
Diameter, first ring, inside	———	———	72 in.
Firebox, length and width	———	———	65 7/16 in. by 65 11/16 in.
Tubes and flues, number and diameter	———	———	228—2½ in.
Length over tube sheets	———	———	9 ft. 6⅜ in.
Grate area	33 sq. ft.	———	30 sq. ft.
Heating surfaces:			
Firebox	127 sq. ft.	129 sq. ft.	140 sq. ft.
Tubes and flues	1,180 sq. ft.	950 sq. ft.	1,480 sq. ft.
Total evaporative	1,307 sq. ft.	1,079 sq. ft.	1,620 sq. ft.
Superheating	785 sq. ft.	615 sq. ft.	640 sq. ft.
Comb. evap. and superheat.	3,092 sq. ft.	1,694 sq. ft.	2,260 sq. ft.
Miscellaneous data:			
Water capacity, boiler	———	11,050 gal.	———
Water capacity, condenser	———	12,150 gal.	———
Cooling surface, condenser	12,900 sq. ft.	12,900 sq. ft.	———
Air preheater, heating surface	8,600 sq. ft.	8,600 sq. ft.	———
Fuel capacity	9 tons	14,300 gal.	6 tons
Maximum speed, m.p.h.	56	40.5	75
Tractive force	32,800 lb.	33,000 lb.	36,000 lb.
Max. hp. rating at rail	1,800	1,750	2,000
Weight proportions:			
Weight on drivers ÷ total engine weight, per cent	35	42.2	37.8
Weight on drivers ÷ tractive force	3.36	3.44	3.0
Boiler proportions:			
Tractive force ÷ comb. heat. surface	15.7	19.5	15.94
Firebox heat. surface ÷ grate area	3.85	———	4.67
Comb. heat. surface ÷ grate area	63.5	———	75.4
Firebox heat. surface, per cent of evap. heat. surface	9.65	11.95	8.64

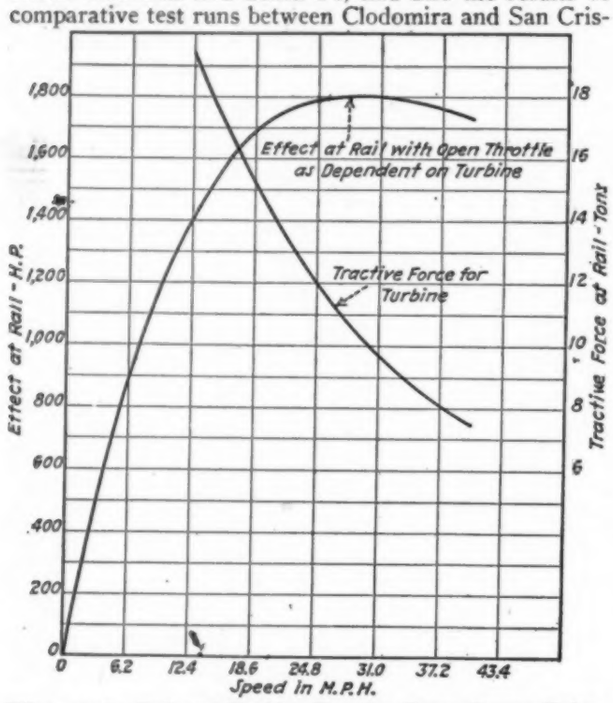


Turbine Efficiency of the Swedish Ljungstrom Turbine Locomotive Calculated from Tests Made in September, 1923


Average Tractive Force at Starts by Adhesion
Output of Turbine
Tractive Force Corresponding to Output of Turbine
Output of Turbine - H.P.
Tractive Force - Lb.
Speed Miles Per Hour

Theoretical Turbine Output and Tractive Force Curves for a 4,000-hp. Ljungstrom Turbine Locomotive—Weight on Drivers, 260,000 lb.—Maximum Speed, 62 m.p.h.

Data obtained from the four official road tests between Tucuman and Santa Fe, and also the results of comparative test runs between Clodomira and San Cristobal, with a piston type locomotive and the turbine locomotive, are shown in two of the tables. The distance between Clodomira and San Cristobal is 274 miles.



Effect at the Rail and Turbine Tractive Force Curves Taken from the Argentine Tests

Summary of Four Road Tests With the Argentine Ljungstrom Locomotive Between Tucuman and Santa Fe

Road test	Date	Air temp., deg. F.	Vacuum, in.	Water consumption, gal. per hr.	Oil consumption, lb. per 1,000 t.m.	Average train weight, tons
1	March 23-25, 26	83	21.5	44	31	920
2	June 13-15, 26	*	*	48	38	920
3	Sept. 17, 19, 26	88-66	*	41	27	1,600
4	Nov. 23-25, 26	100-86	16-22	48	35	1,320

* Not indicated in the report.

The Argentine State Railways aim to operate with as long trains as the construction of the station platforms, and terminal and yard tracks permit. Trains up to 1,800 tons were hauled on the four official test runs.

It is believed that the elimination of the tank portion of the tender, together with the extra water which has to be carried in the train and which is made practicable with the Ljungstrom turbine locomotive, a considerable increase can be obtained in effective ton-miles per year.

Results of Comparative Tests With the Ljungstrom Turbine and a Piston Type Locomotive

	Piston type locomotive	Turbine locomotive
Total water consumption, gal.	24,200	1,100
Water consumption per 1,000 ton miles, gal.	92	3.14
Saving in water per run, per cent	.....	95.5
Saving in water per 1,000 ton miles, per cent	.....	96.6

Tests With First Swedish Locomotive Provide Valuable Data for Future Developments

In February, 1923, negotiations were completed with Messrs. Nydquist & Holm, and Messrs. Beyer, Peacock & Co., Ltd., Manchester, England, for the building of Ljungstrom turbine locomotives. Shortly after the license agreement with these two companies was completed, Nydquist & Holm received orders for an express locomotive from the Swedish State Railways and a freight locomotive from the Argentine State Railways. Shortly after Messrs. Beyer, Peacock & Co., Ltd., received an order from the London, Midland & Scottish.

Both the Swedish and Argentine locomotives contain many similarities in design. The new Swedish Ljungstrom locomotive develops 2,000 hp. and carries a boiler pressure of 280 lb. The wheel arrangement differs from that of the first Ljungstrom locomotive in that it has a four-wheel instead of a two-wheel truck at the rear, the rear unit being of the 0-6-4 type. The Argentine locomotive rear unit has four driving axles and a two-wheel truck. The front units in all three locomotives carry no drivers in this unit.

For purposes of comparison, the results of three road tests for fuel and water consumption, which were made with the Swedish experimental locomotive in 1921, are shown in the table.

These tests were run between Stockholm and Upsala, a distance of 81.77 miles and between Hagalund and Upsala, 34.18 miles. Owing to the uncertainty of defining the losses in the brake arrangement, gears, etc., the economy tests conducted in Sweden were not as exact as were desirable. However, these tests showed

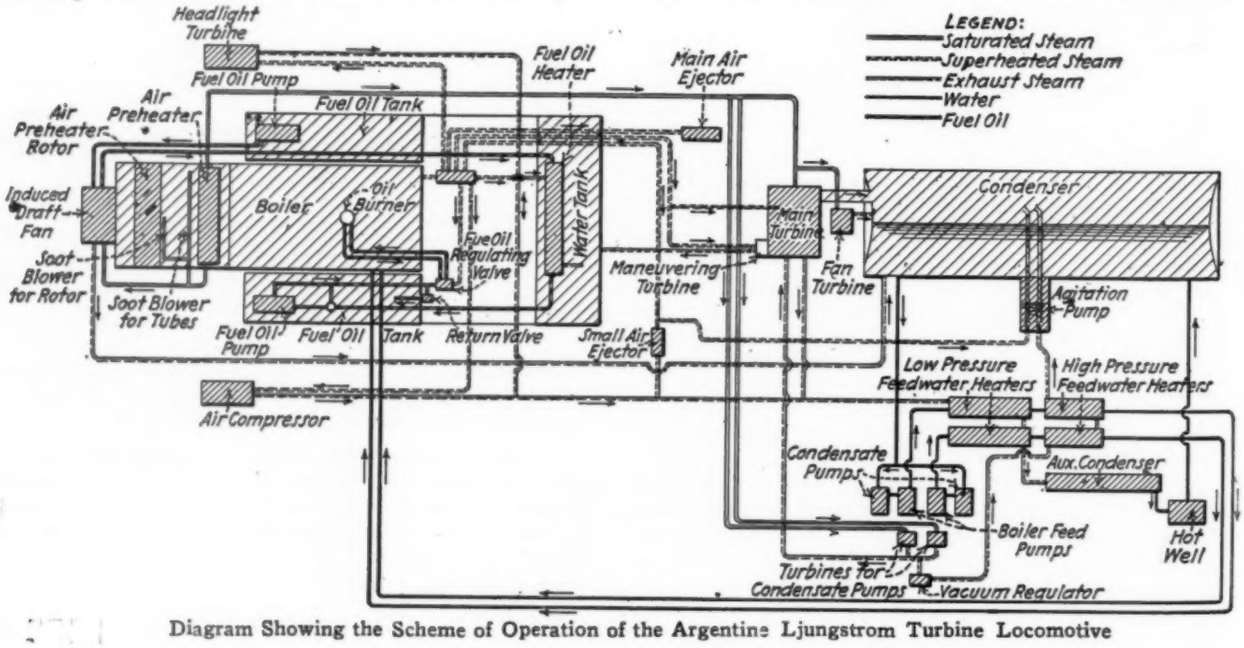


Diagram Showing the Scheme of Operation of the Argentine Ljungstrom Turbine Locomotive

a coal consumption of 1.37 lb. and 1.46 lb. per turbine horsepower-hour, at a speed of over 37 m.p.h. Two additional runs were made, after the weak points in the design had been corrected, that showed a somewhat lower consumption of fuel. Immediately after the completion of these tests, the first Swedish turbine locomotive was placed in regular service.

Results of Three Road Tests for Fuel Consumption Made With the Swedish Experimental Locomotive in 1921

Date of test	July 27	Aug. 12	Aug. 16
Speed of the locomotive, m.p.h.	36.4	37.6	39.6
Brake horsepower	484	478	524
Loss in brake, bearings, gears, circulation pump and fans, hp.	179.5	189.5	205
Output of turbine, hp.	662	670	728
Coal fired per hour, lb.	916	980	1,028
Coal consumption per turbine hp. per hr., lb.	1.37	1.46	1.39
Heating value of coal, B.t.u. per lb.	13,075	13,075	13,030
Heat quantity in coal per turbine hp., per hr., B.t.u.	17,880	19,200	18,100
Thermal efficiency in relation to turbine efficiency, per cent	14.04	13.13	13.82

No test data on the new express locomotive, built by Nydquist & Holm for the Swedish State Railways, are available. It is also a coal burner as was its predecessor.

A Comparison of the Turbine Locomotives

A comparison of the principal dimensions, weights and proportions of the three locomotives built by Nydquist & Holm, and Beyer, Peacock & Co., Ltd., is given in one of the tables. It will be noted that a considerable portion of the total weight is distributed over wheels, other than the drivers, which gives a lower ratio of weight on the drivers to the total weight than is ordinarily obtained on locomotives of the piston type. The factor of adhesion of the Swedish State Railway's locomotive, is 3.36, the tractive force being 32,800 lb. The Argentine State Railway's locomotive exerts a tractive force of 33,000 lb. and has a factor of adhesion of 3.44. The L. M. & S. locomotive has a tractive force of 36,000 lb. and a factor of adhesion of 3.

Another feature of the turbine locomotive, as will be noted from two of the charts, is its large starting torque. The starting torque of a turbine is practically double the torque developed at its maximum efficiency. The Ljungstrom turbine locomotive is designed so that the starting torque can be increased as desired, by the use of a by-pass, which short circuits the high pressure stages of the turbine.

Charging New Prices for Old Material Defended

THE practice on the Atlantic Coast Line of issuing reclaimed, repaired and recovered material at the price of new material has been investigated and criticized from time to time but without showing any fault in the principle or revealing a better plan, according to D. G. Register, in a statement presented to and approved by the supply department of this road at its annual meeting.

Prior to thirteen or fourteen years ago, the idea was accepted that an article once used was not as good as new and it was taken back into the account at an arbitrary percentage of the new value of 60 per cent. However, seldom would two articles be worn to exactly the same depreciated value, for some articles depreciate faster than do others. Reclamation embraces a wide variety of items and some one else could as logically establish 70 per cent as the basis of pricing.

Railway storekeeping differs from commercial storekeeping in that the railroad is its own customer. With the reclaimed material, it is a case of taking the cost out of an operating expense and putting in an asset account when material is returned to stock. It makes no difference what per cent is used if the turnover is fast enough to prevent any distortion in the accounts.

There are three classes of recovered material, usable material not needing repair, usable material needing repair and scrap material beyond repairing. In spite of the best efforts under the old plan, the shopmen would use the old material and not furnish a requisition for it. New material would be charged out at second-hand prices and second-hand material at new prices, owing to the fact that those using the material would fail to designate whether the material was new or second-hand. Often they do not know the difference by reason of the fact that the reclaimed parts, as well as new materials, are sprayed with a thin oil to prevent rusting.

The Atlantic Coast Line was not the only railroad confronted with this problem. At the Twelfth Annual Meeting of the Railway Storekeepers Association in 1915, a paper was presented by C. H. Samson, assistant auditor of the Chicago, Burlington & Quincy, in which it was proposed that this class of material be taken into the accounts at new prices. Mr. Samson contended that if usable second-hand material is handled on a percentage basis, more or less distortion of the material account will surely follow.

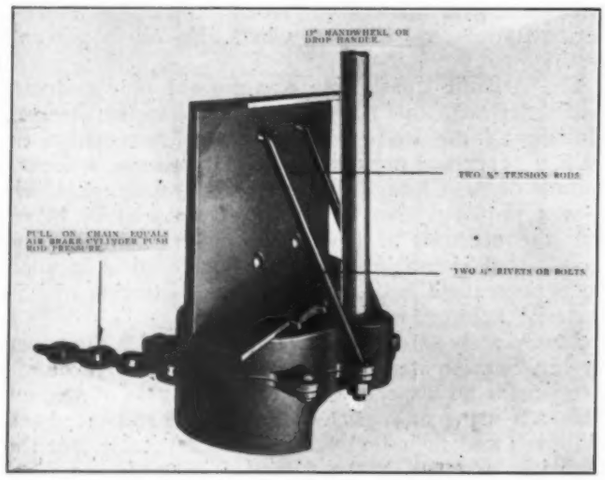
Immediately after the convention, at which the paper by Mr. Samson was presented, Atlantic Coast Line officers made an inspection trip to storehouses of various railroads using new prices for returned and reclaimed materials and their findings were so favorable that the plan was adopted by the Atlantic Coast Line on September 1, 1915. A circular was issued to all storekeepers instructing them to take usable material into their stock at new prices, and all shopmen were impressed with the idea that all material, whether new, second hand or scrap, must be covered by a requisition.

In 1924, after 10 years experience with the plan of charging all material at new prices, the need for determining the cost of reclamation on various articles arose in order to prevent reclaiming material where the cost would be prohibitive, but the practice of using new prices when charging this material to operating expenses, was continued. The method is to take material, returned for reclamation, into the material and supply account at the price of scrap and credit operating expenses with it. A shop order is then created for each job and all reclaimable material is charged to this shop order together with all labor performed and all new material needed in the process of reclaiming. The sum of the scrap material, labor and new material comprises the so-called cost of reclamation and the difference between the cost of reclamation and the value of new material is the amount saved, which is credited to operating expenses.

Material that is reclaimed has a rapid turnover. With few exceptions, it is used and charged out in the same month that the credit to operating expenses is made. In February, the turnover of all material at one store was 113 per cent; at another store 106 per cent; at a third store 119 per cent; at another store 110 per cent and at a fifth store it was 100 per cent. It is known by experience that reclaimed material has a faster turnover than the average material because there is no time lost in transit and the reclamation work is not carried beyond immediate requirements. As a consequence, any credit in one month for a difference in price is offset in the same month by the charge for material when issued for use.

Zeitler Hand Brake Amplifier

MUCH work has been done to provide a suitable and efficient apparatus whereby the brakeman, when switching freight cars, can make an adequate hand-brake application without resorting to the use of a brake club in the hand wheel to provide the required leverage. Tests show that, when using a 16-in. hand wheel without a club and wrapping the chain around the brake mast, the average pull on the pull rod is approximately 800 lb. With 60 lb. of air in the brake cylinder, the push rod can exert a pressure of 3,950 lb.


16" HANDWHEEL OR DROP HANDLE
TWO ⅝" TENSION RODS
PULL ON CHAIN EQUALS AIR BRAKE CYLINDER PUSH ROD PRESSURE
TWO ⅞" RIVETS OR BOLTS

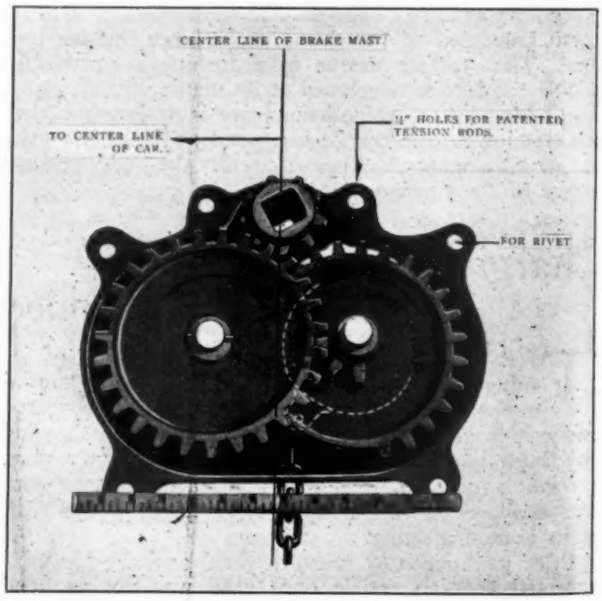
Method of Applying the Zeitler Hand-brake Amplifier to the End Sill of the Car

In order that the brakeman may have at his command a power equal to that of the air brake when the air is off the car, gearing or levers have been applied to the hand-brake system. In the majority of cases a pinion and a large gear is used, the latter having a spool fixed to it, on which the chain is wrapped. The brake cylinder piston has a travel of 12 in. and it is necessary that the spool be large enough to wrap up that amount of chain, plus a little slack. Until this slack and the slack in the brake system is taken up, no pressure can be applied to the brake shoes at the wheels. The gears used in these devices are malleable iron with cast teeth and, owing to the large size and comparatively thin metal, it is quite difficult to secure a gear of malleable iron without warpage. With the rim slightly warped, great friction will develop at the teeth, and they may not even operate.

The use of pinion and one gear has the effect of causing the spool to revolve in the opposite direction from that which the brake mast is moving. Thus the chain wrapping around the spool on the large gear is several inches nearer the wheels than when it was wrapped around the old brake mast. This has been known to cause the wheel to cut the brake chain on curves and render the hand brake useless.

To overcome these difficulties and also to provide means for taking up the slack in the brake system quickly, Raymond S. Zeitler, designing and consulting engineer on railway and automotive equipment, 407 South Dearborn street, Chicago, has designed a device designated as a hand brake amplifier, The gears in this device are small and made of cast malleable iron with extra strong stub teeth. The gears are compounded, thereby securing the desired pull of the hand brake chain and all within a compact space. The entire mechanism is enclosed, thus protecting the gears from damage from any outside cause. By compounding the gears, two results are secured. The spool around which the chain wraps revolves in the same direction that the brake mast turns, and the chain is maintained at the same distance from the wheels as when it is wrapped around the brake mast only. Also, the gears are small, less than half the size as when only a pinion and gear are used, thus practically eliminating warpage. The rule shown in one of the illustrations gives the relative size of the gears.

To operate this device, the pinion with the square hole for the brake mast is in continuous mesh with the large gear on the left. This large gear has cast integral with it on the under side a pinion that meshes with the large gear on the right at the proper time. At the points marked 1, 2, 3, three teeth projected down to mesh with the segment of a pinion cast integral with the gear on the right. The tops of the teeth of this segment are about ¼ in. below the bottom of the teeth of the gear on the right. When the brake mast is rotated a quarter turn, the pinion with the square hole moves so that three teeth on it turn the gear on the left, which gear in turn causes the three projected teeth on it to rotate the segment on the gear at the right. As this gear carries the chain spool around with it, a quarter turn of the hand wheel causes 4½ in. of chain to wrap around the spool quickly, thus taking up the slack. At this point, tooth No. 3 pushes past the last tooth on the segment, and the tooth marked *x* runs into mesh with the pinion cast integral with, and on the side of, the gear at the left. The gears are now in mesh at their greatest ratio and for the balance of the rotation of the spool a continuous rated pull can be exerted on the brake chain. Owing to the construction of the gears, a positive stop of the gearing occurs at each end of its complete movement, and gears cannot run out of mesh.



Plan View with Top Half of the Housing Removed, Showing the Gearing

The shafts upon which the gears revolve are held stationary. The gears are bored for their entire length, which provide exceptionally long and large wearing surface bearings.

Upon analysis of the forces acting to pull the amplifier housing from the sill, it was found that the bracing shown in one of the illustrations would answer all purposes. The lower ends of the two 5/8-in. tension rods are bolted to the housing, and the upper ends pass through the end sill, holding the brake rigidly in position when 7,500 lb. of pull is exerted on the brake chain. Only two bolts or rivets are required to hold the housing to the end sill, and a suitable lug on the housing prevents it from sliding back. The two bolts or rivets are required to hold the housing to the end sill, and a suitable lug on the housing prevents it from sliding back. The two 5/8-in. tension rods take the remainder of the strain.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended August 4 amounted to 1,048,622, an increase of 14,646 cars over the total in the preceding week and of 24,584 cars as compared with the corresponding week of last year but a decrease of 26,770 cars as compared with 1926. The increase over loading a year ago was confined to grain and grain products and miscellaneous freight. Loading in the Eastern, Allegheny, Central Western and Southwestern districts was larger than in the corresponding week of last year. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week ended Saturday, August 4, 1928

Districts	1928	1927	1926
Eastern	238,292	235,268	246,090
Allegheny	212,637	206,045	218,853
Pocahontas	55,518	59,945	57,909
Southern	144,198	146,625	149,128
Northwestern	158,449	158,993	166,167
Central Western	157,699	143,340	158,087
Southwestern	81,829	73,822	79,158
Total Western Districts	397,977	376,155	403,412
Total All Roads	1,048,622	1,024,038	1,075,392
Commodities			
Grain and Grain Products	55,809	51,839	58,811
Live Stock	22,878	25,176	25,512
Coal	154,460	156,431	182,690
Coke	9,099	9,548	11,486
Forest Products	66,393	67,623	69,720
Ore	62,299	62,319	75,561
Mdse. L. C. L.	257,136	259,564	258,551
Miscellaneous	420,548	391,538	393,061
August 4	1,048,622	1,024,038	1,075,392
July 28	1,033,976	1,044,697	1,095,997
July 21	1,033,816	1,012,585	1,078,193
July 14	1,024,534	1,017,394	1,076,372
July 7	850,605	839,085	897,556
Cumulative total, 31 weeks	29,448,658	30,458,839	30,556,742

The freight car surplus during the period ended July 31 averaged 271,017 cars, as compared with 294,646 cars on July 23. The total included 137,618 box cars, 90,513 coal cars, 21,277 stock cars and 12,816 refrigerator cars.

THE PASCO DIVISION of the Northern Pacific during the month of July reported 1,900 employees as working 336,600 hours with but one reportable injury, which occurred to a brakeman while in a caboose as the result of a break-in-two. This division has had the fewest reportable accidents of any of the eleven divisions on the Northern Pacific during this year.

Looking Backward

Fifty Years Ago

At an election held in Cincinnati, Ohio, on August 14 the proposal to issue $2,000,000 additional bonds to complete the Cincinnati Southern [now part of the Southern] to Chattanooga, Tenn., carried by a majority of nearly 6,000.—*Railroad Gazette,* August 16, 1878.

The report of the New York state engineer for 1877 shows that there were 86 horse railroads in operation in that state, eight less than in 1876. Their total debt amounted to more than $20,000,000 and their earnings were 8.26 per cent of the capital stock paid in. The number of steam railroad companies increased by 34 in 1877.—*Chicago Railway Review,* August 17, 1878.

The annual report of the Chicago & North Western for the fiscal year ending May 31, 1878, shows an increase of 11 cents per ton in the average rate received for the transportation of freight, a trend which is quite an exception to the experience of most of the railways of the country. Robert Keep, president, states that it is due to the fact that the new prairies of Minnesota and the partly cultivated areas of the more remote and undeveloped lines are rapidly becoming productive. As a forerunner of this development the report states that the sales of land were considerably larger during the past year.—*Chicago Railway Review,* August 17, 1878.

Twenty-Five Years Ago

The gross earnings of the Baltimore & Ohio for July were $5,862,580, the largest ever earned by the lines included in the statement, and the percentage of expenses to earnings reached the low point of 60 per cent.—*Railway Age,* August 21, 1903.

At a special meeting of the stockholders of the San Antonio & Aransas Pass [now part of the Southern Pacific] at San Antonio, Tex., on August 15, resolutions were adopted authorizing the construction of an extension from Alice, Tex., to Brownsville, about 160 miles.—*Railway Age,* August 21, 1903.

Greater importance is attached to the compelling influence of competition upon transportation rates by the Federal Court than by the Interstate Commerce Commission in a decision overruling an order of the latter body directing the reduction of freight rates from Chicago and other points to Wilmington, N. C. The commission had ruled that the higher rates charged constituted undue preference to Richmond and Norfolk and the court pointed out that existing rates are not unduly preferential to places more favored by natural transportation facilities.—*Railway Age,* August 21, 1903.

Ten Years Ago

In accordance with the general tendency to avoid the use of structural steel wherever possible in the present period of high prices and delayed deliveries, the Canadian Pacific has completed the construction of two reinforced concrete, double-track trestles at North Toronto, Ont. The trestles replace single-track steel viaducts, are approximately 100 ft. high and are 386 ft. long between back walls.—*Railway Age,* August 16, 1918.

The Federal Trade Commission suggests that the Railroad Administration take over the stock cars, stockyards and refrigerator cars of the packing companies, and establish central wholesale markets and storage plants open to all on equal terms as a remedy for the evils it finds in the meat packing industry as at present conducted by the "Big Five." The Railroad Administration has taken over the stock cars but has not, except in a few cases, taken over any stockyards.—*Railway Age,* August 16, 1918.

Communications and Books

J. E. Slater on His Testimony In Accounting Revision Case

TO THE EDITOR:

In *Railway Age* of June 30 there was found a brief of the testimony taken in the Interstate Commerce Commission's investigation into various accounting plans. At the end of that memorandum there was a statement as to remarks made by J. W. Roberts, which seemed to me to attempt to impugn my reputation and the motives behind my testimony in the same case some months ago. These remarks have been called to my attention by Commissioner Eastman, and the facts below are included in my reply to him:

Mr. Roberts, either by direct statement or innuendo, makes two aspersions; first, that though appearing as an independent witness I was really in the employ of the railroads; and second, that the opinions I expressed to the Commission differed from the opinions expressed by me to Mr. Roberts.

With regard to the first, I am not and was not at the time of my testimony employed by any railroad company, or in fact any other company or organization except American Brown Boveri Electric Corporation, of which I am secretary and treasurer. Furthermore, there is not the slightest indication that I will be employed by any railroad company or organization. The only factor Mr. Roberts has in support of his imputation was that I had agreed to assist the New Haven in the so-called commutation case. I agreed to assist in that case with the sole purpose of meeting criticisms and objections to a cost study which I had previously introduced in the same case three years ago. Furthermore, my first connection with that case was several weeks subsequent to the day when I informed Mr. Roberts that my testimony would not be favorable to his study. This connection, therefore, could in no way have affected my judgment or opinion of the Roberts plan and the impression he attempted to create that his knowledge of my connection with the railroads in the commutation case was embarrassing to me is utterly without foundation.

With reference to the second imputation. In my first telephone conversation with Mr. Roberts and subsequent conference with Messrs. Roberts and Beek, I made perfectly clear that my former connection with the railroads would cause my sympathies to be with them because of my long association with them, and the sense of loyalty to my many friends in railroad circles would naturally cause me to side with them rather than with the shippers in any case in which the two were on opposite sides. I had no opinion of the Roberts plan at the time of the telephone conversation and subsequent conference, because I had not the remotest idea as to what the plan was except that it was a cost accounting scheme. No opinion with reference to this plan could therefore have been expressed at that time, or subsequently changed.

Eleven days after my conference with Messrs. Roberts and Beek I wired Mr. Roberts as follows: "After examining plan see no likelihood my testimony being favorable to any extent. Would it not be better if I drop out altogether? This action not due to railroad people who are willing I should testify. Can honestly tell Eastman pressure own work makes impossible detail analysis necessary."

The same day I received the following reply: "Your wire to me Chicago. Our only desire is to get facts before Commission. Therefore, regardless of purport of your testimony would be glad if you can give Commission benefit of your best judgment. Mr. Beek concurs."

That is the only communication or statement that I made to Mr. Roberts with reference to this plan prior to the time that I appeared before the Commission. It was not until I received his reply that I definitely decided to accept your invitation to testify.

I deeply resent the imputation in Mr. Robert's testimony, and request that I be given an opportunity to place formally in the record of this proceeding the full statement of facts, and in greater detail than is possible within the limits of this letter.

J. E. SLATER.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Track of the Irish Mail, by Edmund Vale. L. M. S. Route book No. 1, Euston to Holyhead. An illustrated superguide, pointing out interesting features of the railway line itself as well as of the country on either side. The section "Rail Rhythm" on p. iv, should be noted. 72 p. Printed by McCorquodale & Co., Ltd., London, Eng., 1 shilling.

Marketing California Grapes, by E. W. Stillwell and W. F. Cox. A contribution to recent economic history, describing areas affected by growth of grape industry, time and places of shipment, with some tables of daily, monthly, and weekly shipments by cars from various shipping points. U. S. Dept. of Agriculture Circular No. 44. 153 p. Pub. by U. S. Govt. Print. Off., Washington, D. C., 25 cents

Railroad Facts No. 6—A Yearbook of Railroad Information 1928 Edition, compiled by Western Railways' Committee on Public Relations. Inclusion of a larger number of artistic cuts adds to the looks of this extremely useful reference book. 94 p. Pub. by Western Railways' Committee on Public Relations, Chicago, Ill. *Apply.*

Stalky's Reminiscences, by Major-General L. C. Dunsterville. "Stalky" of Kipling's "Stalky & Co." has followed the admonition of the anagram of his surname, "Never Sit Dull." Some of his most amusing adventures were in railway work in China, (Chapter 13) and in France in wartime (Chapter 16) "You would hardly expect a recumbent figure wrapped in a Burberry, curled up with his head on a cheese in a railway truck, to prove to be a Colonel." 298 p. Pub. by Jonathan Cape, London, Eng., $3.00.

Periodical Articles

Model Railways Rival Real Ones, by L. G. Pope. Illustrated article describing briefly some elaborate miniature systems. Popular Science Monthly, September 1928, p. 34-35.

A Railroad on Cushions, by John Walker Harrington. Projected elevated railroad line to replace 11th Avenue tracks in New York. Popular Science Monthly, September 1928, p. 21.

Railway Electrification in Europe. Maps and illustrations. No. 3—Berlin City and Suburban Railway. Modern Transport, July 21, 1928, p. 3-5. No. 4—The Paris-St. Germain Section of the French State Railways. Modern Transportation, July 28, 1928, p. 5-7.

Recollections of an Engineer in Brazil, by John J. Bayliss. Who built the Madeira-Mamoré Railway and especially why together with some of the vegetable, reptile and animal life that had to be removed from the right of way. The reconstruction of locomotive No. 12 will interest those who like veteran locomotives, p. 198-199. Stone & Webster Journal August, 1928, p. 180-201.

Odds and Ends of Railroading

Erie dining cars are now liberalized with the placard: "You may smoke." Not to be caught napping, the Pullman Company might signalize the new era with the slogan: "You may snore."
—*Chicago Daily News.*

More Fish

The most recent addition to the railway fish-story tellers is J. H. Dyer, general manager, Southern Pacific. Unlike some of the others, Mr. Dyer produces incontrovertible evidence, in the form of a 12-½ lb. trout, which he caught in Lake Tahoe, California.

Another Sideline

O. I. Clew, relief train engineer for the Illinois Central at Memphis, Tenn., is another railroader with an interesting and profitable sideline. Starting two years ago in a small way, Clew has built up a chicken hatchery which has justified the installation of a 6,912-egg-capacity incubator

Champion Scoop?

Fireman Wilson of the St. Louis division of the Baltimore & Ohio claims the world's championship scoop service record. In Wilson's skillful hands, a shovel has seen 2 yr. 4 mo. continuous service, in 36,000 mi. of pool service, and 42,400 mi. of yard service. It is estimated that, during this period, 5,080 tons of coal passed over the scoop.

Frisco "Bunion Derby"

Thirty-three Frisco employees recently competed in a marathon from Billings, Mo., to Springfield, 21 miles, with 10 money awards as prizes. Eighteen of the 33 were present at the finish. The race was won by Chester Ferguson, blacksmith, Springfield shops, in 3 hr. 29 min. 20 sec., who received $100. But, fast as Chester is, he is a tortoise compared to "Frisco Flyer," a racing greyhound owned by W. R. Watts, a brakeman on the Western division, who has won every major race in which he has taken part this year on the Oklahoma dog tracks.

Long Fixed Departure Times

"In the *Railway Age* of June 30, you give the long fixed departure time of the 'Flying Scotsman' on the London & North Eastern," says W. J., of Boston, Mass. "The Fall River Line Steamboat Express has run in continuous service since May 19, 1847—81 years. From 1847 to 1854 at 5 p. m., from 1854 to 1875 at 5:30 p. m. and from October 11, 1875 to the present time, it has left Boston at 6 p. m., making allowance, of course, for short periods during the Spanish and World wars, and the present conforming to eastern standard time in place of the daylight-saving time. The Fall River Line Steamboat Express is one of the very few trains in the United States that have ever had an English coach as a part of its equipment, and from 1864 until 1896 this train had but one conductor, Asa R. Porter, who ran it for 32 years continuous service."

Employees Build Monument

It will come as a distinct surprise to many readers that a battle was fought in Arizona during the Civil War. Yet three Union soldiers were killed at the battle of El Picacho, on April 15, 1862. The forgotten graves of the casualties, Lieutenant James Barrett, Private George Johnson and Private William S. Leonard, were recently discovered only a few feet from the Southern Pacific in Picacho pass, 39 miles northwest of Tucson, by H. M. Stone, signal supervisor, Southern Pacific. Through his efforts, S. P. employees built a monument of native rock, the unveiling of which was attended by 200 persons, including Governor W. P. Hunt, Major G. H. Kelly, state historian, and other prominent Arizonians.

A Watch Returns

C. W. Bordens, Louisville & Nashville conductor, is the victim of an unusual although happy circumstance. While in Livingston, Ky., recently he was notified that the chief of police at Lexington was holding a negro, on whose person was found a 21-jewel Hamilton watch, with the name, "C. W. Bordens, Campbellsville, Ky." on the dial. Arriving in Lexington, Mr. Bordens identified the watch as one that had mysteriously disappeared 14 years before. The negro claimed he found the watch 14 years ago and although living in the same town with the man whose name was on the watch, never could remember to return it to him when he passed him on the street. The judge gave him 60 days for his forgetfulness.

The Thundering Herd

More than 150 Hereford steers and five mules created an unpremeditated rodeo in Kansas City, Mo., on July 24, after they had escaped from a stock train which was derailed two blocks from the Union station. Volunteer cowboys chased the animals through the downtown streets. One steer crashed through the window of a garage, another was knocked down by a street car and several others met and caused mishaps of one sort or another. One of the steers charged into the waiting room of the Union station. In the effort to evade capture, he dashed into the station drug store, with an attendant crashing of glassware. He was finally "bulldogged" and tied in the approved western manner by C. C. Clancy, assistant station master.

Another Auto Ferry Service

In an effort to keep the main highway between Memphis, Tenn., and Little Rock, Ark. open for automobile traffic through a section in Arkansas flooded by rainfall during the week of July 2 to 9, the Chicago, Rock Island & Pacific established a shuttle train of ten flat cars on which the automobiles and their occupants were transported for a distance of 15 miles between Brinkley, Ark., and DeVall's Bluff. A total of 1,360 automobiles and 2,623 passengers were transported on this shuttle train. The floods did not interfere with the regular railway traffic in that section, and the shuttle trains were operated so as not to interfere with the usual passenger and freight service, moving during daylight hours only. In order to accommodate this demand it was necessary for the railroad to construct loading platform facilities and employ special train and engine crews.

An Elaborate Lay-Out

S. E. Peacock, a yardman of the Southern Pacific at Brooklyn, Ore., is the proud possessor of an ingeniously and elaborately constructed electric railway system in his front yard, that ranks with the best model railways in the country. The railway occupies a plot of ground 95 ft. square and includes a model town, a farming district and a busy highway. The town has ten buildings, including a school, church, store, hotel and railway station. There are automobiles and trucks on the highway and three airplanes fly overhead. The railway itself consists of 95 ft. of track 2¼ in. gage, with 126 rails, 882 ties 3½ in. long boiled in oil for preservation, and 2,864 carpet tacks as spikes. There is a 6 ft. trestle, supported on 45 piles. The entire system is landscaped with over 350 miniature trees. The equipment includes 2 electric locomotives, 1 tank car, 1 flat car and 1 gondola car, each loaded with lumber, 1 refrigerator car, 1 box car, 1 stock car and a caboose. Dolls are used to represent railway employees and citizens of the town. On one Sunday in June, the exhibit was visited by 441 automobile parties, including 2,329 people.

THE CANADIAN RAILWAY CLUB will hold its next meeting at Windsor Hotel, Montreal, on the evening of September 10. There will be an illustrated paper on the Welland Ship Canal by W. W. Butler, assistant engineer in charge.

THE WESTERN RAILWAY CLUB will hold its next meeting at Hotel Sherman, Chicago, on the evening of September 17, with a paper by Samuel O. Dunn, editor of the *Railway Age*, on "Where are the Railways Heading?"

THE CINCINNATI RAILWAY CLUB will hold its next meeting at Hotel Gibson on September 11, at 6 p. m. The motion picture depicting the "Fair of the Iron Horse" will be shown, with a brief lecture by a representative of the Baltimore & Ohio.

Coal Stocks a Third Less Than Last Year

Consumers' stocks of bituminous coal on July 1, amounted to 41,700,000 tons, according to a survey just completed by the Department of Commerce; a decrease of 6,000,000 tons in three months. This compares with 63,400,000 tons on July 1, 1927. Home consumption for the period under review averaged 8,312,000 tons a week. In addition to the stocks in the hands of consumers there were 6,204,000 tons of bituminous coal on the docks of Lakes Superior and Michigan.

Pennsylvania Railroad Women's Aid

The Women's Aid of the Pennsylvania Railroad, an organization managed by wives of officers of the company, and developed from an organization established at the time of the World War to aid the families of men who joined the army, has closed its ninth year with a report showing gratifying results. The membership at the close of 1927 stood at 196,608. During the year, 32,417 visits were made to railroad men's families and the sum of $207,731 was expended—all of the money having been raised by dues and voluntary contributions and by bazaars, dances, etc. At Christmas time, 2,482 baskets of food were distributed, 4,631 bouquets of flowers were given to sick persons and others and 5,612 greeting cards were sent to pensioners, shut-ins, and others. The expenditures of money at Christmas time amounted to $17,154. The balance on hand in the treasury at the close of the year was $135,731.

Safety Section Program for September

"Too Late to be Careful" is the title of a picture which constitutes the salient feature of circular No. 200 which has been issued by L. G. Bentley, chairman, outlining the special points which are recommended by the Safety Section, A. R. A. to be emphasized by safety teachers and specialists during the month of September. This engraving shows the sad scene where a man has been shocked or otherwise gravely injured, but the doctor has pronounced the case hopeless. Three other pictures, illustrating how well-meaning but short-sighted men often disregard good advice, are prominent features of the circular. The text of this circular is "The Story of Bill White" an unskilled workman, who, because of his carelessness, was made a cripple for life.

National Safety Congress in New York, October 1-5

The National Safety Council announces that its seventeenth annual safety congress will be held in New York City on October 1, 2, 3, 4 and 5; and that because of the number and variety of sessions and the large number of persons attending, meetings will be held in five hotels—the Pennsylvania, the Waldorf-Astoria, the McAlpin, the Martinique and the Commodore.

The Steam railroad Section will hold its first meeting at the Waldorf-Astoria on Tuesday, October 2, and sessions will be continued through Wednesday and Thursday. At the first meeting, following the address of Chairman E. R. Cott, there will be an address by L. G. Bentley (C. & O.) on safety contests; and a dozen different specialists are expected to take part in the discussion. On Wednesday morning, the principal speakers will be G. C. Varnum; T. P. Brennan, (Long Island); Arthur Keiringer, M. D., and S. H. Osborne, (U. P.).

On Wednesday afternoon: C. T. Bailey, (Oregon Short Line); J. A. Carney, (C. B. & Q.); H. M. Mayo, (S. P.); J. E. Long, (D. & H.); A. B. Huff, (Erie) and Z. B. Claypool, (St. L.-S. F.).

On Thursday morning: W. L. Roller, (Hocking Valley); J. H. Spooner, (N. Y. C.) and J. L. Walsh, (M.-K.-T.).

A. E. R. E. A. Purchases and Stores Meeting

The program for the convention of the American Electric Railway Engineering Association Purchases and Stores Division to be held at Cleveland, September 22-28, has been completed by the committee in charge of arrangements. Following the address of welcome at the opening business session, September 24, papers will be presented by W. E. Scott, superintendent of supplies, Philadelphia Rapid Transit Company; A. S. Duncan, Westinghouse Electric & Manufacturing Company; A. L. Fischer, purchasing agent, Cincinnati Street Railway Company; and W. S. Stackpole, general storekeeper, Public Service Railway Company. On September 25 a paper will be read by C. A. Harris, chief of stores, Philadelphia Company. The session of September 26 will be a joint meeting of the Purchases and Stores division and Accountants' Association.

Among the exhibits at the convention will be a Delineascope, displaying views of stores buildings, stores layout and material handling devices of properties located in several states, as well as Canada and Mexico.

Machine Shop Practice Division, A.S.M.E., National Meeting

The technical sessions of the national meeting of the Machine Shop Practice Division, American Society of Mechanical Engineers, will begin on Monday, Septem-

ber 24, at 8 p. m. aboard the steamer "Cincinnati", leaving for Ashland, Ky., where, on Tuesday morning, September 25, the continuous sheet rolling mill plant of the American Rolling Mill Company will be inspected. On Tuesday evening at 8 p. m. there will be a Symposium on Lubrication, the principal speaker being Forrest E. Cardullo, chief engineer, G. A. Gray Company, Cincinnati, Ohio, who will present a paper on the Theories of Bearing Lubrication. The technical sessions will then be resumed at the Hotel Sinton, Cincinnati, Wednesday, September, 26, at 9:30 a. m. The Symposium on Machine Tools, Their Use and Application in Modern Manufacturing Methods, will include the automotive and railroad fields and other industries. L. N. North, shop superintendent, Illinois Central, Chicago, will discuss the railroad industry.

Inspection trips Wednesday afternoon and Thursday, September 27, will conclude the program for this joint meeting of the Machine Shop Practice Division of the American Society of Mechanical Engineers and the Machine Tool Congress.

Frisco Handles Record Shipment of Salt

What is probably the largest solid trainload of salt ever moved by rail, consisted of 79 cars, and was routed by way of the St. Louis-San Francisco out of Lyons, Kan., on August 2. The destination was Kansas City, Mo., where the train was broken up and the cars were moved to points west. The salt was loaded and shipped by the American Salt Company, of Lyons, Kan., and the trainload totaled 4,193 tons. Three engines were used to haul the train out of Lyons.

C. W. Hall, general manager of the American Salt Company at Kansas City and his assistant, H. H. Mosley, and J. W. Robb, traffic manager of the Cudahy Packing Company, Chicago and M. Y. Dwyer, purchasing agent accompanied the train. Frisco representatives on the special were: J. H. Doggrell, superintendent of transportation, Springfield, Mo.; J. R. Coulter, assistant executive general agent, Kansas City; H. E. Morris, assistant general freight and passenger agent, Wichita, Kans.; W. H. Bevans, superintendent, Fort Scott, Kan., and Ed Carter, assistant superintendent.

New Railroad Sought in Central Oregon

A hearing before representatives of the Interstate Commerce Commission on the petition of the Public Service Commission of Oregon asking that the Interstate Commerce Commission order one of the northwest railroads to build a line across central Oregon from Crane or Burns to a point near Crescent Lake on the Natron cutoff of the Southern Pacific was opened at Portland, Ore., on August 4. H. J. Ottenheimer, a director of the Portland Chamber of Commerce, states that the country for 50 miles on each side of the right-of-way would be directly affected and that thus adequate railroad facilities would be provided for 7,000 sq. mi. of territory in Harney County; 4,900 in northern Lake, Crook and Deschutes counties and 800 in Klamath county.

An exhibit of comparative distances showed that the distance from Burns to Portland by way of Ontario over the present route is 587 miles, while by the proposed line it would be 404 miles, or a saving of 183 miles. From Burns to Bend the distance would be reduced 399 miles, to Eugene 431 miles, to Marshfield 431 miles and to Medford and Ashland 454 miles.

In Harney, Crook, Wheeler, Grant and Klamath counties there is approximately 8,401,000,000 ft. b.m. of standing timber which would be tributary to the proposed road.

This does not include large stands of privately-owned timber which would be opened for lumbering operations.

Tel. & Tel. Section to Meet at Frisco

The Telegraph and Telephone Section of the American Railway Association, W. Rogers, chairman, announces that its annual meeting will be held at Hotel St. Francis, San Francisco, Cal., on Tuesday, Wednesday and Thursday, September 18, 19 and 20. All of the regular committees, except Numbers 8, 9 and 14, will present reports; and, as usual, committee No. 1, on construction and maintenance of outside plant, presents six separate reports as the work of six subcommittees; and committee No. 2, inside plant, presents four sub-committee reports.

Railroad commissioner L. C. Whitsell, of California, will address the Section on Coordination Between Communication and Power Lines and Paul M. Downing of the Pacific Gas & Electric Company will talk on the same theme. C. E. Fleager of the Pacific Telephone & Telegraph Company, will speak on inductive coordination of electric supply and communication lines.

Secretary W. A. Fairbanks announces that copies of the reports and papers will be distributed at an early date. It is planned to run a special train to San Francisco from Chicago, starting on Friday, September 14, at 6 p. m., central time, over the Chicago & North Western, the Union Pacific and the Southern Pacific, and members desiring accommodations on this train are requested to notify A. W. Flanagan, Southern Pacific, San Francisco. It is planned to have this train stop over for a side trip on Lake Tahoe on Monday, September, 17; and arrival at San Francisco is scheduled for Monday evening, about 8:30.

The Los Angeles-Biltmore Hotel, Los Angeles, offers special rates for members visiting that city, and the Yosemite Valley Railroad offers transportation from Merced to El Portal to representatives of roads with which the Yosemite Valley exchanges transportation.

N. I. T. League Asks Revision of Collection Rules

The Interstate Commerce Commission has received a petition from the National Industrial Traffic League for reopening and reconsideration of Ex Parte 73 in which the Commission prescribed rules and regulations effective July 1, 1920 governing the payment and collection of tariff rates and charges, in conformity with paragraph (2) of Section 3 of the Interstate Commerce Act, as amended by Section 405 of the Transportation Act.

The rules and regulations now require reasonable modification because they are unworkable, according to the League's petition, which states: "There are universal violations by carriers and shippers of the letter of the said regulations, which violations are unavoidable, although carriers and shippers generally are obeying the spirit and endeavoring to conform to the letter of the regulations."

Solid Train Load of Salt Moved via Frisco Lines

Western Railroad Security Holders Urge Upward Rate Revision

The Western Trunk Line Railroads Security Holders Committee, representing the holders of $635,000,000 of bonds and a substantial amount of stock of the western roads, has filed a brief with the Interstate Commerce Commission in support of the upward revision of class rates in western trunk line territory, under consideration in Part 2 of Docket No. 17,000, the general rate structure investigation.

If the present trend of earnings in relation to interest charges is not corrected by proper rate revision, the committee's brief asserts, additional bankruptcies in Western Trunk Line territory are inevitable. The committee's brief holds that the two years' experience since July, 1926, has served to prove to the most optimistic that the serious financial position of the western carriers is a persistent and non-improving condition.

While the present proceeding relates only to class rates, the committee's brief states that it represents an attempt on the part of the carriers to secure an upward revision of class rates as the first step in the reform of the entire Western Trunk line rate structure which the Commission said in Ex Parte 87 should be undertaken. The security holders' committee contends that the Commission should not only grant the relief sought but also authorize such additional rate increases as will produce a fair return in Western Trunk line territory.

The committee urges that if the Commission is to keep the rates on agricultural products "near the lowest limit of the zone of reasonableness" under the Hoch-Smith resolution, other rates, including class rates, must be put at the highest limit of the zone of reasonableness.

Government Appeals to Supreme Court in Railway Mail Pay Cases

The fact that there are some 30 cases now pending in the U. S. Court of Claims involving approximately $3,900,000 awaiting the result of the determination of the question whether "the Interstate Commerce Commission in fixing rates for carrying the mails on a railroad and for the service connected therewith has power to make its order increasing rates cover retroactively the period between the date of the filling of the carrier's petition for increase and the date of the order for an increase," has led the Department of Justice to file in the Supreme Court of the United States a petition for a writ of certiorari to the Court of Claims to have the issue finally determined.

The brief of the Department states that in 1923 the Interstate Commerce Commission held that it had no power to make its order increasing the railway mail pay retroactively effective from the date of the filing of the application of increase. In 1925, however, upon reargument the Commission made a finding of fact that the mail rates in effect when the carrier's petition for increase was filed were not fair and decided what rates were fair but did not make an order increasing the rates retroactively. Later, on further reargument, in 1925, the Commission overruled its former conclusion, "and with four commissioners dissenting held that it had power to make its order for increase operative from and after the date of the filing of the carrier's petition." After commenting upon the fact that 30 cases now pending in the Court of Claims involving approximately $3,900,000 await the result of a decision in this case, the Department in its brief says that on July 10, 1928, the Interstate Commerce Commission decided the case entitled "Railway Mail Pay," granting to carriers an increase in railway mail pay of about $15,000,000 per year. "The order also made said increase retroactive from its date for a period of about three years. Therefore, the retroactive features of said order involve about $45,000,000."

The Department in its brief, among other things, says: "We do not see any very definite ground on which to complain of the conclusion of the court below. The statute is not very clear and it is open to the interpretation placed upon it by the court below, and it must be conceded that the result of that interpretation is just to the carrier and not unjust to the United States, and were it not for the difference of opinion that has heretofore existed about the meaning of the statute and the very large sums involved, we would not feel it necessary to carry the litigation further."

After this comment the Department's brief says: "We want to be sure that the principle works both ways, and that when the United States files a petition for reduction of the rates for carrying mail and a reduction is ordered the reduction may be effective from the date of the filing of the petition for reduction. We are assuming that the day may come when prices stop going up and tend to go down, and that petitions for reduction of rates may follow."

The Department in its brief, after calling attention to the amounts of money involved in the question to be determined, adds that "under these circumstances, considering the difference of opinion that has existed among the members of the Interstate Commerce Commission and the very large sums involved, we have not felt justified in acquiescing in the decision of the Court of Claims without submitting the case to this Court for the exercise of its sound discretion as to whether a writ of certiorari should issue."

Car Officers Associations Are Consolidated

The executive committees of the Railway Car Department Officers' Association and the Southwest Master Car Builders' and Supervisors' Association, respectively, held a joint session, August 8, at the Hotel Statler, St. Louis, at which plans were perfected for a joint convention on September 11, 12 and 13, as mentioned in the *Railway Age* of August 11. The question of consolidating the two associations into a single body was also discussed at length and it was decided that in the interest of economy and greater efficiency this step should be taken. The consolidation was effected, subject to the formal ratification of members at the joint convention, and the name "Master Car Builders' and Supervisors' Association" was chosen for the new association. The program of the joint meeting, to be held at the Hotel Statler, St. Louis, September 11, 12 and 13 is as follows:

Tuesday, September 11, 1928, Morning

10:00 a.m. Meeting called to order by G. W. Moore, assistant superintendent of motive power, St. Louis-San Francisco, and president, Southwest Master Car Builders' and Supervisors' Association.
10:05 a.m. Invocation by B. F. Jamison, special traveling auditor, Southern.
10:10 a.m. Address of welcome by Honorable Victor J. Miller, mayor of St. Louis.
10:25 a.m. Response by T. J. O'Donnell, chief interchange inspector, Niagara Frontier Interchange Association.
10:30 a.m. Address by President Moore.
10:45 a.m. Report of secretary-treasurer, E. H. Weigman, M. C. B., Kansas City Southern, for Southwest Master Car Builders' and Supervisors' Association.
11:30 a.m. Address by Henry Miller, president, Terminal Railroad Association of St. Louis.
12:00 a.m. Address by Colonel B. W. Dunn, chief inspector, Bureau of Explosives, Washington, D. C.

Afternoon Session

2:00 p.m. Address by E. R. Campbell, St. Paul, Minn., president, Railway Car Department Officers' Association.
2:15 p.m. Report of secretary-treasurer, A. S. Sternberg, M. C. B., Belt Railway of Chicago, for Railway Car Department Officers' Association.
2:20 p.m. Address by R. C. White, assistant general manager, Missouri Pacific.
2:40 p.m. Address by F. W. Brazier, assistant general superintendent rolling stock, New York Central.
3:00 p.m. Paper and discussion on "Higher Maintenance of Freight Car Equipment to Reduce Terminal and Transit Delays," by L. R. Wink, assistant superintendent car department, Chicago & North Western.
4:30 p.m. Address on "Freight Claim Prevention in Relation to Maintenance of Freight Car Equipment," by Joe Marshall, special representative, American Railway Association.

Wednesday Morning

9:00 a.m. Paper and discussion on "The Elimination of Angle Cocks from Passenger Car Equipment," by J. P. Stewart, general supervisor of air brakes, Missouri Pacific.
10:15 a.m. Paper and discussion on "Efficiency of Car Shop Operation," by B. J. Huff, efficiency supervisor, Chicago & Eastern Illinois.
11:30 a.m. Report of committee on "Elimination of Grease Spots and the Preparation of Cars for Commodity Loading," W. T. Westall, assistant M. C. B., New York Central, chairman.

Afternoon Session

2:00 p.m. Report of committee on "Painting All Classes of Car Equipment," E. S. Wilkins, master painter, Frisco Lines, chairman.
3:00 p.m. Paper on "Testing of Car Materials," by J. R. Jackson, engineer of tests, Missouri Pacific.
4:00 p.m. Report of Question Box committee (A. R. A. Rules of Interchange), J. Matthes, Jr., traveling car inspector, Wabash, chairman.

Thursday Morning

9:00 a.m. Joint report of A. R. A. committee and discussion of A. R. A. Rules of Interchange, H. A. Siegwart, supervisor car repair bills, Missouri Pacific, chairman.
10:30 a.m. Discussion of A. R. A. (Division 5) committee report on "Freight and Passenger Car Lubrication and Reclamation of Waste and Oil," by J. H. Gimpel, assistant superintendent car department, Wabash.
12:00 noon. Paper on "The Inspector," by A. Armstrong, chief interchange inspector, All Lines, Atlanta, Ga.

Afternoon Session

2:00 p.m. Report of executive committees on reorganization and consolidation of the two associations, S. O. Taylor, chairman, Southwest executive committee; B. F. Jamison, chairman, executive committee of the Railway Car Department Officers' Association.
3:00 p.m. Report of nominating committee and election of officers for the ensuing year.
4:30 p.m. Closing remarks by presiding officers.
5:00 p.m. Special remarks by T. J. O'Donnell.

Traffic

The Chicago Great Western in an effort to stimulate travel by train has established a round trip fare of $18 between Chicago and St. Paul, Minn., and Minneapolis, effective during August, with a return limit of 10 days.

The Southwest Shippers' Advisory Board will hold its next meeting in the Baker Hotel, Dallas, Tex., on September 27. Special attention will be given to the cotton crop, and the citrus fruit and winter vegetable movements from southern districts.

The Chicago, Milwaukee, St. Paul & Pacific advertises a one-hour sight-seeing trip through St. Paul and Minneapolis for the benefit of the passengers on train No. 15, the west bound "Olympian." Motor coaches will take passengers from the train at St. Paul, make a tour of the twin cities and deliver them at the station in Minneapolis in time for them to continue their journey on the train.

Although the co-ordinated railway and air service between the northwest and the east is not to be inaugurated officially until August 20, the first air-rail passenger has already been carried. He was sold ticket No. 725 by the district passenger agent of the Pennsylvania at St. Paul, Minn., calling for transportation by airplane from St. Paul to Chicago and transportation by train from Chicago to New York. The passenger left St. Paul in the afternoon of August 10, arriving in Chicago in ample time to catch the Gotham Limited of the Pennsylvania for New York at 9 p.m. On the same day, two women passengers left Tulsa, Okla., at 1 p. m. by airplane and caught the eastbound, St. Louis section of the Gotham Limited at Effingham, Ill.

The Bureau of Service of the Interstate Commerce Commission has issued a mimeographed circular of proposed amendments of transportation of explosives and other dangerous articles. Petitions pertaining to these amendments will be considered at the next oral hearing in Docket 3666. A memorandum of these changes include the following: Changes in the method of packing dynamite; increase in the maximum weight of charcoal screenings in cars over 36 ft. 6 in. long; increase in quantity and higher loading densities for anhydrous ammonia and liquefied petroleum gases; weight of express shipments of pyroxylin plastics increased; extension for one year from November, 1, 1928, of the test period for special fiber board or pulpboard cases for matches, which includes a change in the shipping container specification; and the shipment of films by express, reel lengths extended.

The large new fruit and vegetable auction terminal of the Boston & Maine at Boston, has now completed one year of service and the company congratulates itself on the large increase in the fruit and vegetable traffic of Boston within these 12 months. The total consumption of fruits and vegetables at Boston in the year last reported, amounts to 500,000 tons, and in several prominent commodities the increase in one year has been so great that Boston surpasses Philadelphia in the volume of this traffic. About one-fourth of the quantity named—8,145 carloads—consists of potatoes, of which the Boston & Maine delivers practically the whole. Attention is called to the fact that the receipts recorded at Boston (figures partly from the bulletin of the Railway Economics), represent cars actually unloaded in that city and do not include movements through to other points. The grapes received at Boston in 1927, totaled 5,543 carloads, or 15 per cent over the previous year.

Restrictive Tariffs on Grain Products Suspended

The Interstate Commerce Commission has issued an order suspending the operation of tariff schedules proposing to restrict the application of grain and grain products rates so that they will not apply on such articles when prepared as food for human consumption. Higher class or prepared food rates would apply instead. The schedules under suspension until March 15, were filed to become effective August 15, as published in Supplements Nos. 43 and 45 to Chicago, Milwaukee, St. Paul and Pacific Railroad Company's tariff, I.C.C. No. B-4742 and Supplement No. 3 to joint tariff, Agent W. S. Curlett's I.C.C. No. A-223, Agent B. T. Jones I.C.C. No. 2092, Agent H. G. Toll's I.C.C. No. 1207, and Agent Frank Van Ummersen's I.C.C. No. 94.

Railroads Protest Reduced Grape Rates

The Erie Railroad and other carriers affected by the Interstate Commerce Commission's order reducing the rates on grapes from the so called Chautauqua & Erie belt in New York and Pennsylvania have petitioned the Commission for a reopening of the proceeding. The railroads state that notwithstanding the construction and effect given the Hoch-Smith resolution, the rates and ratings prescribed by the Commission are excessive and oppressive and infringe the rights of the carriers. Their petition asserts that the rates ordered represent an enormous decrease and that the reductions are excessive and exorbitant even when measured by the prior action of the Commission in reducing rates on grapes from California. The petition sets forth that in the California case the reductions were from $1.73 to $1.60, a net reduction of 13 cents, or about 8 per cent, contrasted with the average reduction in this case of 19½ cents or 25.5 per cent to Central territory and 16½ cents or 22.8 per cent to New England and Eastern trunk line territory.

Equipment and Supplies

Freight Cars

THE CUYAMEL FRUIT COMPANY, NEW ORLEANS, LA., is inquiring for 75 banana cars.

THE ERIE is now inquiring for 5 depressed center flat cars, of 120 tons' capacity.

THE CITIES SERVICE COMPANY has ordered 10 tank cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of July 21.

THE CHICAGO, SOUTH SHORE & SOUTH BEND—see Midland Utilities Company of Indiana.

THE SANITARY DISTRICT OF CHICAGO has received bids for 54 air dump cars, of 30 cu. yd. capacity.

THE NORFOLK & PORTSMOUTH BELT LINE is inquiring for two steel underframes for caboose cars.

THE ILLINOIS TRACTION SYSTEM, Springfield, Ill., is inquiring for from 100 to 200 composite gondola cars, of 50 tons' capacity.

THE MISSOURI PACIFIC has ordered 100 automobile furniture cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of July 28.

THE MIDLAND UTILITIES COMPANY OF INDIANA, has ordered for the Chicago South Shore & South Bend, two 30-ft., steel underframe caboose cars, from the American Car & Foundry Company.

THE CHESAPEAKE & OHIO has placed orders for 500 steel hopper bottom gondola car bodies of 70 tons capacity, as follows: American Car & Foundry Company, 200; Richmond Car Works, 300. Inquiry for this equipment was reported in the *Railway Age* of August 4.

Passenger Cars

THE READING is inquiring for two combination passenger and baggage gas-electric cars, three combination passenger, baggage and mail gas-electric cars and three trailers.

Signaling

THE MINNEAPOLIS & ST. LOUIS has contracted with the General Railway Signal Company for the installation of automatic signals for the regulation of trains over a crossing at Aberdeen, S. D.

THE CHICAGO, BURLINGTON & QUINCY has ordered from the General Railway Signal Company material for installation of the G-R-S dispatching system at Sullivan, Wis. This system will have a ten-

lever machine. The order includes eight switch machines.

THE BALTIMORE & OHIO has ordered from the Union Switch & Signal Company 186 color-position-light ground signals, and other material preparatory to the establishment of an automatic block signal system on its line betwen Grafton, W. Va., and Parkersburg, 104 miles, single track. Announcement of this project was noted in the *Railway Age* of June 30.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company an electro-mechanical interlocking to be added to an existing machine at Elyria Junction, Ohio; six working levers. Also, a modified Federal type electric interlocking, four levers, for Signal Station 29, Utica, N. Y.; also materials for the installation of automatic train control, intermittent inductive automanual type, on the line between Rochester, N. Y., and Niagara Falls, 78 miles. The last-mentioned order includes 163 track inductors, 150 relays and other material.

Iron & Steel

THE NEW YORK, NEW HAVEN & HARTFORD has taken bids on 140 tons of steel, for a bridge at North Windham, Conn.

THE TEXAS & PACIFIC is inquiring for 4,000 tons of structural steel for miscellaneous bridge work.

THE WHEELING & LAKE ERIE has placed orders for about 3,500 tons of rail, with the Carnegie Steel Company.

THE NORTHERN PACIFIC has ordered 100 tons of structural steel for bridge repairs at Darrington, Wash., from the Pacific Car and Foundry Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 1,000 tons of structural steel for bridge work at Topeka, Kan., from the American Bridge Company.

THE PENNSYLVANIA AND LEHIGH VALLEY are inquiring for 6300 tons of steel, for approach spans of the Newark Bay drawbridge.

THE SOUTHERN RAILWAY ordered 550 tons of steel from the Virginia Bridge & Iron Company, for a bridge over the Ocmulgee river at Lumber City, Ga.

THE ERIE has taken bids on 100 tons of steel for a mail building at Jersey City; this road gave an order to the Jones & Laughlin Company for 425 tons of steel for a bridge at Youngstown, Ohio.

THE PENNSYLVANIA has ordered 200 tons of steel from the American Bridge Company for three bridges in Ohio, and has given an order to the same company for three other bridges aggregating 875 tons.

THE NEW YORK CENTRAL has given a contract to the George W. Rogers Construction Corporation for 1000 tons of steel, for sheds and ferry bridges in the West Shore slip at Weehawken.

Supply Trade

A. W. MacLean, has been appointed a special representative of the **MacLean-Fogg Lock Nut Company,** Chicago.

Max Epstein, president of the **General American Tank Car Corporation,** Chicago, has been elected chairman of the board, and will be succeeded by **Elias Mayer,** general counsel and vice-president.

The American Rolling Mill Company, Middletown, Ohio, has awarded a general contract to H. W. Cox, Ashland, Ky., for the construction of a one-story storage and distributing unit 160 ft. by 270 ft. at Ashland to cost $175,000.

The Transportation Equipment Company, Graybar building, New York, has been appointed sole distributors of **Hopkins Spray Equipment Company,** San Francisco, Cal., for all the railroads of the United States.

A. F. Morris, vice-president and sales manager of the **Morgan Engineering Company,** Alliance, Ohio, has been elected president of that company. **S. F. Kallenbaugh,** assistant sales manager has been elected sales manager and will be succeeded by **Tom J. Muir,** sales office manager.

Plans for the consolidation of **Steel and Tubes Incorporated,** Cleveland, Ohio, with the **Republic Iron & Steel Company,** have been negotiated and now await approval of the stockholders. **Myron A. Wick,** president of **Steel** and Tubes Incorporated, will continue to manage the business of that company.

The Syntron Company, Pittsburgh, Pa., has appointed the following district sales managers: **R. M. Hibbs,** at 1426 Fairmount avenue, Philadelphia, Pa.; **F. L. Johnson,** 2146 East Fourteenth street, Cleveland, Ohio; **William Heritage,** 3711 Delmar avenue, St. Louis, Mo.; **G. A. McKee,** 1759 West Forest avenue, Detroit, Mich.; and **C. W. Osborn,** at 2404 Main street, Dallas, Tex.

The transformer division of the **Packard Electric Company,** Warren, Ohio, has been purchased in its entirety, by the **American Brown Boveri Electric Corporation.** The Packard company, transformer division, has made a wide range of transformers which will be continued in all types and sizes, under the established trademark Packard. The manufacturing and engineering facilities will be consolidated with those of the other departments of the American Brown Boveri Electric Corporation's Camden, N. J., plant. It is understood that **N. A. Wolcott,** president of the Packard Electric Company, will become affiliated with the American Brown Boveri Electric Corporation.

Trade Publications

"1928 LOCOMOTIVE PROGRESS."—This is the title of a 52-page brochure issued by the Superheater Company, 17 East Forty-second Street, New York, illustrating a few representative examples of locomotives equipped with the Elesco superheater. Among the locomotives illustrated are the Hudson 4-6-4 type locomotive for the New York Central, the three-cylinder Pacific type locomotive for the Mexican Railway, the Pacific type locomotive for the Canadian Pacific, the Northern Pacific, 4-8-4 type locomotive, the Union Pacific three-cylinder 4-12-2 type locomotive, the simple articulated 2-8-8-2 type locomotive for the Denver & Rio Grande Western, and the Chesapeake 2-8-8-2 type locomotive for the Chesapeake & Ohio.

Obituary

J. B. Laughlin, a director, and member of the executive committee of the Jones & Laughlin Steel Corporation, died on August 12, at his summer home at Hyannisport, Mass. Mr. Laughlin had served as treasurer of the Jones & Laughlin Steel Company from 1904 to 1910. He was in his sixty-fourth year at the time of his death.

Floyd E. Patterson, director, secretary and treasurer of the American Steel Foundries died on August 12 at St. Luke's hospital, Chicago. He was also a director and vice-president of the Griffin Wheel Company, a director and vice-president of the Damascus Brake Beam Company, and a director and president of the Galesburg Malleable Castings Company. He was born on

Floyd E. Patterson

March 13, 1859 at Yorktown, Ill., and devoted practically all of his career to the steel and allied industries. On the formation of the American Steel & Wire Company in 1898, he became assistant secretary and New York office manager of that corporation. When the American Steel Foundries was incorporated in 1902 he was elected secretary and treasurer of that company, which position together with that of a director, he has held until his death.

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to Jerome A. Moss, Chicago, for the construction of a subway at Cicero avenue, to cost $80,000. A contract has been awarded to Johnson & Beck, Topeka, Kan., for the installation of piping in the yards, for yard supply and fire protection, at Emporia, Kan., to cost $80,000.

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to the Ogle Construction Company, Chicago, for the construction of a 500-ton, three-track, reinforced concrete coaling station, in which will be included a complete gravity sand handling plant, at Syracuse, Kan.

BALTIMORE & OHIO.—Bids are being accepted by this road for a 14,000-gal. per hour water treating plant at Morgantown, W. Va.

BELLEFONTE CENTRAL.—The Interstate Commerce Commission has authorized this company to construct a 6-mile line between Struble, Pa., and Fairbrook.

BOSTON & ALBANY.—A contract for alterations and extensions to bridges of this road at Hudson, N. Y., and Springfield, Mass., has been awarded to the New England Construction Company, Springfield. The work is expected to cost approximately $50,000.

BUFFALO, ROCHESTER & PITTSBURGH.—A contract has been awarded to the Roberts & Schaefer Company, Chicago, for the construction of an "N. & W." type electric engine coaler at Bradford, Pa.

CENTRAL VERMONT.—A contract has been awarded to the Roberts & Schaefer Company, Chicago for the construction of a 300-ton capacity, 3-track, reinforced concrete, coaling station and sanding plant and a cinder plant at White River Junction, Vt.

CHICAGO, BURLINGTON & QUINCY.—A contract has been awarded to the Ogle Construction Company for a 200-ton capacity, electrically operated timber coaling station in Kansas City, Mo.

CHICAGO, BURLINGTON & QUINCY.—This road has awarded a contract to Ernest Leafgreen for the construction of a passenger station at Bayard, Neb., and another at Minatare to cost $25,000 each. A contract was also awarded to the Pittsburgh Des Moines Company for the construction of a water treating plant of 500,000 gal. per day capacity at Centralia, Ill.

CHICAGO, ROCK ISLAND & PACIFIC.—Bids are being accepted for the construction of a one-story brick mill building, 60 ft. by 160 ft. at Silvis, Ill.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—Bids will be closed on August 23 for the construction of second track on 35 miles of line from Lexington, Ky., to Danville, Ky.

GRAND TRUNK.—A contract has been awarded to the Ogle Construction Company, Chicago, for the construction of a 300-ton, four-track, electrically operated coaling station, in which will be incorporated reinforced concrete water storage tanks of 50,000 gal. capacity, at Lansing, Mich.

GREAT NORTHERN AND NORTHERN PACIFIC.—Judge A. C. Hoppmann of the Dane County circuit court at Madison, Wis., has handed down a decision confirming the order of the Wisconsin Railroad Commission, compelling the Great Northern and the Northern Pacific to separate the grades of the line used jointly by these two roads and a street at Superior by the construction of a viaduct. The cost of its approaches was apportioned between the railroad companies, the Duluth and Superior Street Railway Company, which will use the viaduct, and the City of Superior.

LOUISVILLE & NASHVILLE. — Tentative plans for a two-story freight and passenger station to cost approximately $75,000 at Madisonville, Ky., have been submitted to the Chamber of Commerce.

NEW YORK CENTRAL.—Bids were closed on August 14 for the construction of extensions to bridges to take care of additional tracks for the union station at Cleveland, Ohio.

NORTHERN PACIFIC.—This road plans the construction of steel car repair shops to cost $200,000 at Laurel, Mont.

PACIFIC ELECTRIC.—A contract has been awarded to the Lynch-Cannon Engineering Company, Los Angeles, Cal., for the construction of a double-track bridge over the Los Angeles river on the Glendale line, to cost $130,000.

PENNSYLVANIA.—Three contracts for bridge construction have recently been awarded by this road; the first, involving approximately $112,000, for the construction of an undergrade bridge at Charlotte avenue, Jersey City, N. J., was awarded to Henry Steers, Inc., New York, while a second for an overhead bridge on Baldwin avenue, Jersey City, went to the Stillman-Delehanty-Ferris Company, Jersey City. Approximately $45,000 is involved in this contract. The third for the reconstruction of an overhead bridge at Wallingford, Pa., was awarded to the Philadelphia Construction & Engineering Company, Philadelphia, Pa. This work is expected to cost about $17,000. The road also awarded a contract to the Belmont Iron Works, Philadelphia, for steel frame work in connection with the construction of a warehouse for the Universal Carloading & Distributing Company at Kearny, N. J.

SOUTHERN PACIFIC.—Construction of an extension from its line at Kerman, Fresno county, Calif., six miles, to a connection with the Fresno Traction Company at Biola is proposed in an application to the Interstate Commerce Commission.

Financial

ATCHISON, TOPEKA & SANTA FE.—*Substituted for Orient Noteholders Committee.*—By order of the Interstate Commerce Commission on the petition of this company it has been substituted for the English noteholders' protective committee as intervenor in the proceedings on its application for authority to acquire control of the Kansas City, Mexico & Orient.

ATCHISON, TOPEKA & SANTA FE.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of $14,691,000 of California-Arizona lines first and refunding mortgage bonds, series C, said bonds to be held in its treasury. The company's subsidiary, the California, Arizona & Santa Fe, will assume obligation with respect to these bonds.

BELLEFONTE CENTRAL. — *Construction Authorized.*—The Interstate Commerce Commission has authorized this company to construct an extension from Struble, Pa., to a connection with the Pennsylvania at Fairbrook, 6 miles, and has authorized it to acquire at salvage value that part of the Pennsylvania's Fairbrook branch between Stover and Fairbrook, 18.3 miles, to be abandoned by the Pennsylvania, the applicant to have trackage rights over the Pennsylvania from Stover to Tyrone, 2 miles.

COMBS, CASS & EASTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for permission to abandon the remaining portion of its road extending from Frazer to Combs, Ark., a distance of 7 miles.

CONDON, KINZUA & SOUTHERN.—*Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue $203,600 of capital stock to the Kinzua Pine Mills Company, to assume the obligation of the Kinzua Lumber Company to the Oregon-Washington Railroad & Navigation Company for the payment of $71,380.92 due on the purchase of rails, and to issue a note and mortgage for $125,000 in favor of the Kinzua Lumber Company.

DENVER UNION TERMINAL.—*Directors elected.*—At a meeting of the Denver Union Terminal Company on August 7, Robert Rice, vice-president and general manager of the Colorado & Southern was elected vice-president to succeed George W. Martin, formerly general agent of the Chicago Rock Island & Pacific, now retired. E. D. Hungerford, division superintendent of the Chicago, Rock Island & Pacific at Fairbury, Neb., and Ed. Flynn, general manager of the Chicago, Burlington & Quincy at Omaha, Neb., were named new directors. J. S. Pyeatt, president of the Denver & Rio Grande Western, was re-elected president.

GEORGIA & FLORIDA.—*Bonds.*—The Interstate Commerce Commission has au-

thorized this company to issue $149,500 first mortgage 6 per cent gold bonds, series B, in temporary form to reimburse itself for uncapitalized expenditures and to finance the additional cost of constructing its Greenwood extension, these bonds to be pledged and repledged as security for short-term notes.

GREAT NORTHERN PACIFIC.—*Reply to Milwaukee.*—A brief filed with the Interstate Commerce Commission in reply to that of the Chicago, Milwaukee, St. Paul & Pacific opposing projected unification of the Great Northern and Northern Pacific Railways, states that the "real and only interest of the Milwaukee in this proceeding is to prevent any unification in the Northwest, thus depriving the public of the great benefits accompanying the unification here proposed, unless "(a) the Milwaukee can be unified with one of the Northern Lines, first stripping that Northern Line of its Burlington ownership and relationship, or "(b) the Milwaukee be given, by way of a condition to the Commission's order of approval herein, rights virtually equivalent to joint ownership with the Northern Lines in the extensive industrial terminals of the Northern Lines in the cities of the Pacific Northwest, which the Northern Lines have acquired at great expense and through great effort during the many years of their establishment in this territory."

The applicants assert that the Milwaukee's contention that it should be grouped with one of the northern lines ignores, in effect, the long-standing relationship of each of northern lines with the Burlington, regardless of the practicability or desirability of disrupting that relationship.

"Such a position on the part of the Milwaukee is clearly untenable," the applicants' brief declares.

KANSAS CITY SOUTHERN.—*Bonds of Subsidiary.*—The Interstate Commerce Commission has authorized the Kansas City & Grandview to issue $3,000,000 of first mortgage guaranteed gold bonds, series A, to be guaranteed by the Kansas City Southern, the issue to be used to finance the construction of a 13.24-mile line in Jackson county, Mo.

KANSAS CITY SOUTHERN.—*Anti Trust Case.*—The Clayton Act proceedings against the Kansas City Southern Railway and the Missouri-Kansas-Texas Railroad have been reassigned by the Interstate Commerce Commission for hearing on October 22, at Dallas, before C. D. Mahaffie, Director of the Bureau of Finance. The application of the M. K. T. for authority to acquire control of the K. C. S. and the St. Louis Southwestern, or either of them, is scheduled for hearing on the same date.

LOUISIANA & ARKANSAS.—*Unification.*—Acquisition and operation of the Louisiana & Arkansas Railway and acquisition of control of the Louisiana Railway & Navigation Company by this company, a new Delaware corporation, is proposed in an application to the Interstate Commerce Commission. The new company proposes to finance acquisition of the properties of the Louisiana & Arkansas, the old Arkansas corporation, by issuing pro rata to the stockholders of the old company 50,000 shares of non-cumulative 6 per cent preferred stock of $100 par value, and 100,000 shares of common stock without par value.

The new company proposes to acquire control of the Louisiana Railway & Navigation Company by acquiring all its outstanding stock and by a 999-year lease of the L. R. & N. lines and other property. The new company will issue $8,000,000 of 5 per cent first mortgage bonds and $4,000,000 of 5½ per cent second mortgage bonds to Mrs. Sarah Edenborn in exchange for the capital stock outstanding, having an aggregate par value of $8,131,000, and other securities and indebtedness.

The applicants state in support of the plan submitted for the Commission's authorization that the transfer of the old L. & A. property to the new company and acquisition of control by the latter of the L. R. & N. will strengthen both roads and effect a development and expansion which the present corporate structure of the old company would not permit. The proposed lease of the L. R. & N. is urged as effecting a unification of the lines of the old company and the navigation company under the operation of the new company which will form a new system in the southeastern portion of the southwestern region.

"The two lines in question, operated independently are weak in comparison with the systems with which they compete in the Southwestern region," the application to the Commission states. "The unification of these lines will form a logical transportation system of about 636.71 miles from Southern Arkansas to New Orleans. Such a system will be able to compete more successfully with existing systems in the territory to be served, to give more efficient service to shippers, and to earn the fair return contemplated by the Transportation Act.

LONG ISLAND.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue $5,889,750 of capital stock, shares $50 par, said stock to be sold to present stockholders at par to secure funds to meet existing indebtedness.

LOS ANGELES & SALT LAKE.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment of 0.4 miles of line at Rialto, Calif.

NORTH LOUISIANA & GULF.—*Operation Authorized.*—The Interstate Commerce Commission has authorized this company to acquire and operate a 25.7-mile line between Hodge and Danville, La., and to issue $200,000 of capital stock, shares $100 par, to be delivered to vendors. This amounts virtually to a reincorporation of an existing company, which has been operating under a charter which expired in 1916.

ROCHESTER SUBWAY.—*Trackage Rights Over.*—The Interstate Commerce Commission has authorized the New York State Railways (electric), the Buffalo, Rochester & Pittsburgh, the Erie, the Lehigh Valley and the New York Central to operate over the Rochester subway to serve industries located along its line.

SEABOARD AIR LINE.—*Bond Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue $571,000 of 6 per cent first and consolidated mortgage bonds to reimburse its treasury for expenditures made in retiring equipment trust obligations. The carrier proposes to pledge the bonds as collateral for short term notes.

ST. LOUIS-SAN FRANCISCO.—*Readjustment.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of the payment of principal and interest on $46,437,500 of Kansas City, Fort Scott & Memphis refunding mortgage 4 per cent bonds, $3,323,390 of general mortgage 4 per cent bonds and $4,651,280 of income mortgage 5 per cent bonds of the Kansas City, Memphis & Birmingham and $1,978,000 of Kansas City & Memphis Railway & Bridge first mortgage 5 per cent bonds.

TEXAS-NEW MEXICO. — *Construction.* — The Interstate Commerce Commission has authorized this company to build a 23-mile line from a connection with the Texas & Pacific at Monahans, Tex., northerly and northwesterly to the Texas-New Mexico state line, with the proviso that the proposed route be altered to serve the town of Wink.

Dividends Declared

Canadian Pacific.—Common, 2½, quarterly; preferred, 2 per cent, semi-annually; both payable October 1 to holders of record August 31.

Pere Marquette.—Common, $1.50, quarterly; preferred, $1.25, quarterly; prior preferred, $1.25; both payable November 1 to holders of record October 5.

St. Louis-San Francisco.—Common, $1.75, quarterly, payable October 1 to holders of record September 1; 6 per cent preferred, $1.50, quarterly, payable November 1 and February 1, 1929, to holders of record October 8 and January 7, 1929.

Southern Pacific.—$1.50, quarterly, payable October 1 to holders of record August 24.

Union Pacific.—Common, $2.50, quarterly; preferred, $2.00, semi-annually; both payable October 1 to holders of record September 1.

Average Prices of Stocks and of Bonds

	Aug. 14	Last week	Last year
Average price of 20 representative railway stocks.	116.98	118.55	119.09
Average price of 20 representative railway bonds..	91.85	92.64	94.93

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes, as of the respective valuation dates, as follows:

Butte, Anaconda & Pacific	$7,105,000	1920
Virginia & Carolina Southern	671,600	1918
Nevada County Narrow Gauge	560,270	1916
California Western R. R. & Navigat.	1,780,000	1917
Wisconsin & Michigan	2,261,636	1916
Des Moines Union Railway	2,912,000	1918

Officers

Executive

Robert Dodd has been appointed president of the Algoma Eastern, with headquarters at Montreal, Que. **W. C. Franz,** vice-president, has also been appointed general manager, with headquarters at Sault Ste. Marie, Ont.

W. H. Marsh, principal assistant engineer of the Spokane, Portland & Seattle with headquarters at Portland, Ore., has been promoted to assistant to the president to succeed F. S. Biays transferred to other duties. Mr. Marsh was born on November 7, 1882, at Marseilles, Ill., and graduated from the University of Illinois in 1904. His early experience was with the Chicago & Eastern Illinois and the Illinois Traction System. In September, 1905, he entered the employ of the St. Louis-San Francisco and in the following year became assistant engineer of the Chicago, Ottawa & Peoria. In 1909 he was appointed assistant engineer of the Ore-

W. H. Marsh

gon Short Line which position he held until September, 1912, when he entered the employ of the Spokane, Portland & Seattle as assistant engineer. On January 1, 1918, he was appointed principal assistant engineer, which position he held until his recent appointment.

Financial, Legal and Accounting

J. W. Bourscheidt, has been appointed auditor of the St. Louis Southwestern with headquarters at St. Louis, Mo.

W. H. Luckett, assistant auditor on the Southern, with headquarters at Washington, D. C., has been appointed assistant general auditor, with the same headquarters.

Victor **F. Steinberg, trainmaster of** the Terminal Railroad Association of St. Louis, has been promoted to treasurer to succeed his father **George H. Steinberg,** who died on July 12 after a continuous service of over 51 years with the terminal organization. Victor S. Steinberg was born at St. Louis, Mo., and

Victor F. Steinberg

has been in the terminal service 28 years. He has held the position of trainmaster for the last 12 years.

Thomas H. Seay, auditor for the Southern, with headquarters at Cincinnati, O., has been appointed general auditor, with headquarters at Washington, D. C., succeeding J. B. Duke, deceased. Mr. Seay was born on June 28,

Thomas H. Seay

1884, at Huntsville, Ala., and was educated in the private, public and high schools, Chaffin Business College and Georgetown University. He entered the service of the Southern in March, 1901, as check clerk at Huntsville and served consecutively to June, 1906, as assistant cashier and ticket seller at Huntsville, chief clerk, and cashier at Sheffield, Ala., chief clerk and station accountant at Huntsville and chief clerk and cashier at Corinth, Miss. He was then appointed traveling auditor and auditor of station accounts, in which position he served until December, 1914, at which time he became chief clerk and auditor of station accounts. He served as auditor of station accounts from February 1, 1919, to February 29, 1920, and on the latter date he was appointed auditor of freight accounts. He served in this position until October, 1927, when he was promoted to auditor of the Cincinnati-New Orleans Lines, in which capacity he served up until the time of his appointment as general auditor. Mr. Seay's entire railway service has been with the Southern.

Operating

F. J. Gavin, who has been promoted to assistant general manager of the Great Northern, will have headquarters at Duluth, Minn., instead of St. Paul, as reported in the *Railway Age* of August 4.

A. J. Clarkson has been appointed superintendent of electric equipment on the New York Central, succeeding **J. A. Carmody,** resigned. **F. E. Edwards** has been appointed assistant superintendent of electric equipment.

J. P. Cowley, acting division superintendent of the Gulf, Colorado & Santa Fe with headquarters at Galveston, Tex., has been appointed assistant to the general manager, with the same headquarters.

A. E. Yarlott, assistant superintendent of dining service on the Boston & Albany, with headquarters at Boston, Mass., has been appointed superintendent of dining service, with the same headquarters, succeeding **J. H. Marcy,** who has been placed on the retired list after serving 37 years with the above company.

Traffic

J. D. Bethea, has been appointed agricultural agent of the Kansas City Southern with headquarters at Texarkana, Tex.

J. C. Kirk, assistant general freight agent of the Nashville, Chattanooga & St. Louis with headquarters at Nashville, Tenn., has been appointed first assistant general freight agent with the same headquarters.

George Diefenback, has been appointed assistant to the traffic manager of the Cleveland, Cincinnati, Chicago & St. Louis with headquarters at Dayton, Ohio.

H. G. Dow, assistant general freight agent of the Great Northern, with headquarters at New York, has been appointed eastern traffic manager with the same headquarters.

C. S. Cox, traveling freight agent of the Kansas City Southern, with headquarters at St. Louis, Mo., has been promoted to coal traffic agent with headquarters at Kansas City, Mo.

E. W. Clark, has been appointed general live stock agent of the Ft. Worth & Denver City with headquarters at Fort Worth, Tex. **Arthur Walker** has been appointed assistant general live stock agent with headquarters at Amarillo, Tex.

L. G. Hoff, general freight and passenger agent, of the Southern Pacific of Mexico with headquarters at Guadalajara has been promoted to traffic manager to succeed **H. Lawton,** who has been retired at his own request, and will be succeeded by **J. Alarcon,** assistant general freight agent, who in turn will be succeeded by **J. Saldamando,** district freight and passenger agent at Nogales, Ariz. The latter will be succeeded by **Charles Levin,** district freight and passenger agent at Nogales, Ariz., who in turn will be succeeded by **M. Levy. L. A. Veazey,** traveling freight and passenger agent with headquarters at New Iberia, La., has been appointed district freight and passenger agent with headquarters at Alexandria, La. **Dick Smith,** has been appointed district freight and passenger agent with headquarters at Tucson, Ariz. **Theodore Bergerson,** has been appointed district freight and passenger agent at Reno, Nev.

Raymond A. Walton, who has been promoted to assistant freight traffic manager of the Wabash with headquarters at Chicago, was born at Nanticoke, Pa., on October 10, 1885 and entered railway service as a stenographer in the passenger department of the Chesapeake & Ohio at New York in November, 1903. In June, 1904, he entered the employ of the Missouri Pacific in the same capacity and during the eight years following he held various positions, including that of city passenger agent. On August 1, 1911, he was appointed city passenger agent of the St. Louis-San Francisco at New York, which position he held until August 1, 1913, when he became chief clerk in the freight department of the Wabash at New York. Later he was appointed junior and then senior contracting freight agent, which position he held until May 31, 1918, when the office was closed during federal control. During this period he specialized in export traffic moving through the Atlantic, Gulf and Pacific ports. On the return of the railroads to private control, Mr. Walton resumed employment with the Wabash in New York as assistant to the general agent in the freight department. In the fall of 1920, he was appointed eastbound freight agent, which position he held until October 15, 1921, when he was promoted to general agent of the freight and passenger departments at Philadelphia, Pa. On March 1, 1925, he was promoted to assistant general freight agent at Chicago, which position he has held until his recent appointment.

Raymond A. Walton

Engineering, Maintenance of Way and Signaling

R. L. Woodling, signal supervisor of the Atchison, Topeka & Santa Fe with headquarters at Fresno, Cal., has been promoted to assistant signal engineer of the northern district with headquarters at La Junta, Colo., succeeding **A. M. Staley,** who has been assigned to other duties.

J. C. Patterson, superintendent of maintenance on the Erie, with headquarters at New York, has been appointed chief engineer of maintenance of way, with the same headquarters. Mr. Patterson was born on January 21, 1882, at Carmichaels, Pa., and was graduated from Pennsylvania State College in 1905. He entered railway service in June of that year, serving as rodman in the maintenance of way department of the Pennsylvania until August, 1906. From the latter date until April, 1907, he served as a draftsman on the New York Central & Hudson River (now a part of the New York Central), and from April to October, 1907, he served on railroad location on the Cleveland, Cincinnati, Chicago & St. Louis. He then became field engineer for John C. O'Bryan, consulting engineer, which position he occupied until April, 1909, when he entered the service of the Chicago Great Western as assistant engineer. Mr. Patterson was chief draftsman for the Erie from July, 1913 to May, 1916 and then became assistant valuation engineer for the same road. He served as office engineer from February, 1917, until June, 1918, and then was appointed principal assistant engineer, which position he held until March, 1920. At the latter time he was appointed regional engineer of the New York region and served in that capacity until February, 1927, when he was appointed superintendent of maintenance. The latter position has now been abolished.

Purchases and Stores

C. E. Kelsey, has been appointed purchasing agent of the Denver & Salt Lake succeeding **A. Knodt.**

H. W. Nelson, has been appointed purchasing agent of the New Orleans Great Northern with headquarters at New Orleans, La., succeeding **G. W. Grossner.**

Mechanical

J. P. Driscoll, master mechanic on the Erie, with headquarters at Little Ferry, N. J., has been appointed master mechanic at Secaucus, N. J., succeeding **L. R. Laizure.** The position of master mechanic at Little Ferry, N. J. has been abolished.

Thomas Hambly, assistant superintendent in the motive power and car department of the Canadian Pacific with headquarters at Winnipeg, Man., has been promoted to general superintendent of the Algoma district, with headquarters at North Bay, Ont., succeeding **Andrew Halkett,** who has been transferred to the Alberta district.

Charles S. Giles, superintendent of machinery of the Louisville & Nashville with headquarters at Louisville, Ky. has retired. He was born on November 2, 1856 at Rowlesburg, W. Va., and entered railway service in 1873 as a machinist apprentice on the Baltimore & Ohio at Wheeling, W. Va. From 1877 to 1882 he was a machinist for this road, the Texas & Pacific, the Pennsylvania and the Louisville & Nashville, and from the latter date until 1887 he was a roundhouse foreman and machine shop foreman on the latter road. In 1887 he was appointed master mechanic at Birmingham, Ala., which position he held until October 1, 1902 when he was made master mechanic at the main shops at Louisville, Ky. On February 1, 1904 he was promoted to assistant superintendent of machinery and June 30, 1911 he was appointed superintendent of machinery, which position he has held until his retirement.

Special

Dr. John R. Nilsson, has been appointed chief surgeon of the Union Pacific, with headquarters at Omaha, Neb., to succeed **Dr. A. F. Jonas,** retired, in accordance with the provisions of the pension system.

Obituary

Homer T. Dick, general solicitor of the Chicago & Eastern Illinois, with headquarters at Chicago, died on August 11 after an illness of about three months.

George E. Keyes, industrial development agent on the New York, New Haven & Hartford, died in Westfield, Mass., on August 3, from pleurisy. Mr. Keyes entered the purchasing department of the New Haven at the age of 17, serving in various capacities until July, 1925, when he was appointed industrial development agent.

Samuel Oppenheim, executive secretary of the Missouri, Kansas & Texas during the years 1889 and 1890 and assistant general counsel for the same road from 1896 to 1901, died on August 13, at his home in New York. Mr. Oppenheim was 69 years of age.

Parker B. Stofer, assistant comptroller on the Southern Pacific, died at Norwich, N. Y., on August 12 of heart disease. Mr. Stofer was 51 years of age and had been connected with the Southern Pacific for 30 years.